all, that they should receive wholesome food, as fresh as it can be, and if preserved, preserved in some unobjectionable way either by the well known condimental preservatives mentioned above or by desiccation or by sterilization. In the light of our present knowledge it is safer to exclude artificial colors and antiseptics from food products.

Dr. Lewis—Is there any discussion of Dr. Wiley's paper?

Dr. Darlington—I would just like to say a word for Dr. Wiley, for I think it is one of the most important works that is now taking place in the United States. It certainly is a long, long step toward health and sanitation to have pure food.

I think Dr. Wiley should be supported by everybody, in every way; and I want to say that, as far as New York city is concerned, he will have the most hearty cooperation in everything that he has mentioned in that paper.

Dr. Johnson—Mr. Commissioner, I desire to offer a resolution of thanks for the valuable paper that has been read this evening by Dr. Darlington. It is very instructive, and one of great importance, and I think this convention appreciates it. I will offer that resolution.

Dr. Phillips—It gives me great pleasure to second that motion.

(The resolution was put, and unanimously carried by the Conference.)

Dr. Lewis—This closes the work which has been laid out for the Fourth Sanitary Conference, and brings our labors to a close.

In dismissing the meeting, permit me to express to you the feelings of the Department of Health in regard to your presence here. We feel encouraged by your coming here; we feel that we have been instructed by your presence and your discussions on the different subjects, and in every way it will be a great advantage to the Department for the coming year.

If you gentlemen have in any way profited by the meeting, as we trust you have, the other object of its having been called will have been fully consummated.

I thank you,—I thank you for the privilege of shaking you by the hand, of hearing you speak, and I hope that we may all of us be here another year, to repeat this conference.

(The Conference adjourned *sine die.*)

TWENTY-FIFTH ANNUAL REPORT

OF THE

New York

(State) Department of Health

NEW YORK

FOR THE YEAR ENDING DECEMBER 31, 1904

TRANSMITTED TO THE GOVERNOR FEBRUARY 1, 1905

ALBANY
BRANDOW PRINTING COMPANY
STATE LEGISLATIVE PRINTERS
1906

STATE OF NEW YORK

No. 59

IN ASSEMBLY,

FEBRUARY 1, 1905

TWENTY-FIFTH ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH

OFFICERS

OF

STATE DEPARTMENT OF HEALTH.

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WM. E. JOHNSON, M. D	*Secretary*
F. C. CURTIS, M. D	*Medical expert*
T. A. STUART	*Chief clerk*
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R. M. PEARCE, M. D	*Director Bureau of pathology and bacteriology*
PROF. WILLIS G. TUCKER	*Director Bureau of chemistry*
HERBERT D. PEASE, M. D	*Director Antitoxin laboratory*
H. R. GAYLORD, M. D	*Director of Cancer laboratory*
PROF. OLIN H. LANDRETH	*Consulting engineer*
HERBERT D. SCHENCK, M. D	*Consulting ophthalmologist*
GEO. H. FOX, M. D	*Consulting dermatologist*
J. J. R. CROES	*Consulting engineer*

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REPORT.

ALBANY, *February* 1, 1905.

Hon. FRANK W. HIGGINS, *Governor of the State of New York:*

SIR.—I have the honor to transmit to you the annual report of the Department of Health for the year ending December 31, 1904.

The period covered by this report practically completes a term of four years since the Legislature abolished the State Board of Health, organized May 29, 1880, and established the State Department of Health, February 19, 1901.

All the powers belonging to the original board were conferred upon the Department by the statute, and the administrative power vested in a single head, the State Commissioner of Health. As the change was a radical one never before adopted by any State, a brief review of the operation of the new plan may be of interest to you, as well as some of the modifications of the Public Health Law which have been the natural result of the reorganization.

The first and most important change demanded was a more intimate official relation between the State Department and the 1,406 local boards of health throughout the State, for upon those officials depend the accuracy and completeness of the returns to the bureau of vital statistics, the reports on complaints of alleged nuisances within their jurisdictions and the enforcement of the law prohibiting the pollution of the waters of the State. (Chapter 468, Laws of 1903.)

The appointment of the local health officers was therefore transferred from the local boards to the State Department—the various boards simply *nominating* the health officers to the commissioner, who, after investigating the candidate's professional qualifications and finding the same satisfactory, makes the appointment for a term of four years, such officer being removable only for cause after a hearing and the approval of the findings by the head of the State Department. By this plan the State is now provided with a corps of sanitary officers having a secure tenure of office, and who are in a large measure independent of local influences, which experience has shown are not always favorable to the highest degree of sanitary administration. Marked improvement in the character and efficiency of this great body of local health officers is already apparent in every department of our work. It will be a still further advance in the administration of the Public Health Law when these officers receive their compensation directly from the State, as the small amount allowed by a large number of local boards of health is totally inadequate for the services rendered. Under such a plan more thorough inspections of complaints could be made by officials clothed with State authority, and unsanitary conditions more promptly corrected than is now possible with the limited number of officers available for such special services.

Measures for the protection of the public against contagious and infectious diseases may now be promptly formulated and executed under the Department as now organized to a degree impossible under the former State Board, most members of which could not be quite familiar with many of the cases presented for their action.

Without entering into a discussion of the advantages of undivided responsibility, which was the basis of the legislation establishing the State Department of Health, the general plan of the organization seems to have been justified by the past four years' experience.

THE DIVISIONS OF DEPARTMENT WORK.

This report, together with the addenda annexed, is grouped under the following heads:

1. Bureau of Vital Statistics.
2. Bureau of Chemistry.
3. Bureau of Pathology and Bacteriology.
4. Antitoxin Laboratory.
5. Cancer Laboratory.
6. Investigations ordered by the Governor.
7. Sanitary condition of the State.
8. Financial statement.
9. Sewer systems.
10. Protection of water supplies.

BUREAU OF VITAL STATISTICS.

The Registrar of Vital Statistics has filed his complete report for 1904, showing the following grand totals for the State:

Births	165,014
Deaths	141,363
Marriages	74,677

The indexing and filing of a grand total of 381,054 certificates gives some idea of the large amount of clerical work required for the proper preservation of these valuable papers. Nearly 1,800 of these certificates were defective and returned for correction.

The fireproof filing cases authorized by the Legislature have been installed during the year and the records are now not only secure against destruction by fire, but also easy of access by means of the card index system, which was installed four years ago.

Evidences of neglect by local authorities in the collection and forwarding of certificates are shown by a study of the registrar's report, notwithstanding the most strenuous efforts by the Department to secure absolute compliance with the law. There has been great improvement, however, in this respect over former years, and we believe that registration in the State will ultimately become satisfactory.

When the fact is recalled that each one of these 381,054 certificates is a legal document, upon which may rest the proof of legal marriages, legitimacy of children, and the distribution of estates, the importance of the Bureau of Vital Statistics cannot be overestimated.

Additional clerical service is a necessity in this bureau and I have asked the Legislature to provide for one additional clerk.

BUREAU OF CHEMISTRY.

Professor Willis G. Tucker, chemist of the Department, reports that during the past year the work done by the Bureau of Chemistry has chiefly consisted in the analysis of waters, of which ninety-five samples from various localities have been examined. Other matters referred to the bureau have received prompt attention, and various analyses of miscellaneous articles have been made, but the appropriation made by the Legislature for the chemical work of the Department has been insufficient to admit of any systematic examination of foods or drugs, the examination of illuminating oils or investigations in other directions.

The samples of water examined came from the following localities and were mostly received from local boards of health: Albany (four samples), Albion (four samples), Barryville (four samples), Broadalbin, Canajoharie (six samples), Canandaigua (three samples), Ellenburgh Depot, Goshen, Hammondsport, Liverpool (four samples), Lyons, Middletown, Mohawk (two samples), Moravia (two samples), Nanuet, Newark (two samples), Newburgh, New Paltz (three samples), Olean (three samples), Oneida (eighteen samples), Palmyra, Rochester, Rome, Rye (six samples), Schenectady, Schroon Lake, Sidney (two samples), Tarrytown (two samples), Trumansburg, Waterloo (twelve samples), Watertown (four samples). Particulars concerning these samples, with the analytical results, will be found in the report of the directors.

The miscellaneous articles examined included samples of formaldehyde solution, for the Board of Health of Utica; samples of elixir of calisaya, of strychnine sulphate tablets, and of triple bromide tablets, for the health officer of Fulton; a fluid of which chloride of zinc was the chief constituent; a sample of head-cheese, for the health officer of Rome; a sample of sausage meat, from the health officer of Scotia; a sample of mustard, from the health officer of Oriskany Falls; a sample of sewage, from the Ray Brook State Hospital, and a sample of chocolate confectionery, from the health officer of Mount Vernon. On August 10th the director visited Sidney for the purpose of inspecting the water supply and taking samples of water for examination. Reports upon these various examinations will be found in the report of the director.

It is again recommended that an appropriation of not less than $2,500 be made for examining the quality of the kerosene oil sold

at retail in this State. There is good reason to believe that considerable oil of inferior and dangerous quality is sold, and the Department of Health is charged by law with the responsibility of enforcing the laws regulating the sale of illuminating oil. No work has been done in this direction for years through lack of funds, and the matter is one of the utmost importance, which ought no longer to be neglected. Recent legislation has made other departments jointly responsible with the Department of Health in the supervision of the food supply and of drugs, but much of this work, and especially for State institutions, ought to be done and may most conveniently be done by this Department, for which reason the appropriation for carrying on the general chemical work of the Department ought to be very materially increased.

BUREAU OF PATHOLOGY AND BACTERIOLOGY.

Professor R. M. Pearce, Director of the Bender Hygienic Laboratory, has conducted the bacteriological and pathological work of the Department during the year.

Examinations are made at the request of local health officers only for the purposes of diagnosis and the prevention of the spread of contagious diseases.

The total examinations thus made were as follows:

Diphtheria	775
Sputum (for tuberculosis)	323
Widal tests (for typhoid fever)	132
Potable water	381
Miscellaneous	12
Total	1,623

These examinations are of the utmost importance to the various municipalities, especially to the vast majority who have no facilities for conducting such investigations.

The demands for bacteriological work have largely increased since the establishment of the bureau in 1901, there having been 118 reports made to the Department, showing an increase of 1,505 over the records of that year, and this increase is certain to continue. The financial arrangement with the trustees of the Bender Laboratory was made on the basis of the first year's work, and the Department cannot reasonably expect such service to be continued without an increased compensation. I have, therefore, asked for an increase of the appropriation for this service from $1,500 to $2,500 for the coming year. The regular price for the examinations made during 1904 would amount to over $10,000. The State cannot reasonably expect such valuable service without reasonable compensation therefor.

Antitoxin Laboratory.

Steady progress was made during the past year in the work of the Antitoxin Laboratory. The amount of diphtheria antitoxin distributed during the year was 25 per cent. greater than during 1903. The increase would have been greater but for the very gratifying fact that in a measure, through the assistance of the prompt use of immunizing doses of antitoxin by those in charge of State hospitals and charitable institutions, there have been no large epidemics of diphtheria in any State institution. Those State institutions in which diphtheria had been present almost continuously for several years before the laboratory's establishment and during its first two years' existence have been, during the past year, either entirely free from the disease or nearly so. A partial explanation at least of this result may be ascribed to

the thorough immunization with antitoxin supplied by this Department of all persons who have been in any way exposed to infection with diphtheria bacilli.

A larger number of State institutions have supplies of antitoxin on hand for immediate use than ever before, and these constitute the strongest possible protection against the development of a large epidemic of the disease. Antitoxin is now regularly supplied to all but one of the cities in the State and to the health officers of 669 villages and towns, or an average of over 11 localities in each of the 57 counties of the State outside of those comprising New York city. It can very soon be said that antitoxin is obtainable within a very few hours of the discovery of a case of diphtheria in any portion of this State where the disease will be at all likely to occur. In fact, the telegraphic demands for antitoxin to be sent immediately, made by health officers of locations not before supplied, are now of rare occurrence, although they were very frequent in the early history of the work.

As has been pointed out in previous reports, one of the most valuable features of the State production and distribution of antitoxin lies in the feasibility of this widespread distribution and consequent rapid availability of the remedy.

How important the early treatment of diphtheria with antitoxin really is was shown in the report of last year, where the death rate of cases first treated before the third day of the disease was 3 per cent., while the death rates for those first treated on the third, fourth and fifth days were 10 per cent., 15 per cent. and 24 per cent., respectively. In other words, of cases not treated until the fifth day of the disease, eight times as many will die as would end fatally if injected before the third day.

The production and distribution of antitoxin by the State, making feasible the wide distribution of stocks of the remedy and eliminating all hesitation as to time or dosage on the part of patient, guardian or physician on the score of expense, accomplishes more in the saving of lives than can ever be demonstrated by statistical studies.

That the cost of the remedy under any other method of distribution would tend toward hesitation and insufficiency of dosage can be inferred from the fact that in 1,200 cases where the reports sent in permitted the determination of the total dosage, the average amount of antitoxin used per case would have cost at retail $7.50, and in 161 cases it would have averaged $8 each; in 121 cases it would have averaged $12 each; in 28 cases it would have averaged $15 each, and in 79 cases it would have cost from $16.50 to $300 each, with an average of about $32 each. Even in this small series of cases it is clearly evident that if the State did not produce and distribute diphtheria antitoxin for the use of the poor, the latter would either not receive any antitoxin treatment or a most inadequate and insufficient dosage, and the fatalities resulting would be very largely increased.

There has been a decided increase in the amount of tetanus antitoxin used for the protection of persons so injured as to render possible the subsequent development of this dreadful disease, especially in the so-called Fourth of July injuries. There has been a decided decrease in the number of cases of the disease. While the demand for immunizing doses has increased, that for the therapeutic doses has decreased. As the former use of the remedy gives perfect protection and its use in cases of the well-developed disease gives but doubtful relief, the good effects of

the educational features of the laboratory work are becoming evident.

Until the present time the strictly laboratory work has been carried on in the Bender Hygienic Laboratory. The main branches of the work of the latter have increased to such an extent that its trustees deemed it wise to request the Antitoxin Laboratory to obtain other quarters at its earliest convenience. In accordance with this request the frame dwelling adjoining the stable of the Antitoxin Laboratory on Yates street, Albany, which was purchased in accordance with a provision of chapter 729 of the Laws of 1903, is being fitted up for the antitoxin work now carried on in the Bender Laboratory. This arrangement can only be considered in the light of a temporary makeshift, as the new quarters are not of the substantial and permanent character which work of this kind requires for its proper and economical management.

I would, therefore, urge that immediate consideration be given the question of providing a permanent building for this important work. A building in which both the Antitoxin Laboratory and the Bureau of Pathology and Bacteriology could be installed could be built for a sum the interest of which would not exceed the amount now paid to the Bender Laboratory for rent, and such an arrangement would greatly increase our facilities.

CANCER LABORATORY.

The report of the Cancer Laboratory at Buffalo for the year 1903-4 is filed herewith and shows a vigorous prosecution of the objects for which the laboratory was established, viz., "the investigation into the cause, nature, mortality rate and treatment of cancer." It is difficult to conceive of a more valuable line of study for the people of the State than that here contem-

plated. The lines of investigation are numerous. The problems to be solved have defied the most determined efforts of scientists throughout the world, and yet we believe are capable of solution. Since the annexed report was prepared a possible discovery of great practical value has been made at the laboratory.

Briefly stated, the experiments were begun by innoculating mice with the cancer (adenocarcinoma) material from two white mice which Dr. Gaylord, pathologist of the laboratory, secured from Professor C. O. Jensen of Copenhagen in February of last year.

Thus a series of mice in various stages of cancer were constantly on hand for critical observation.

After a few months a certain number of the infected mice began to recover and the tumors in these cases entirely disappeared. In others the transplanted tumors began to grow with great rapidity and virulence.

The blood was secured from the mice which had spontaneously recovered and injected into those suffering from the rapidly growing tumors, the result being a rapid and complete disappearance of three tumors and a marked inhibition of the growth in many others.

These experiments were controlled in the usual manner. Serum from the mice which had been cured was found to act in the same manner as that from those which recovered spontaneously. The changes in the disappearing tumors have been carefully examined microscopically, and the changes in epithelium seem to be allied to simple atrophy, while the connective tissue stroma increases.

We cannot here give all of the brief report on these experiments, but the above results certainly challenge our profound interest.

Should it be found that a human subject may be cured by serum treatment the most important part of the study of cancer will have been solved.

These investigations should certainly be continued, the results of these experiments verified upon larger animals, and the stage reached when a serum may be properly tested upon the human subject. Should the possibilities now foreshadowed be ultimately realized, the State of New York will be entitled to the credit of having made possible the cure of one of the most fatal of all human diseases.

INVESTIGATIONS ORDERED BY THE GOVERNOR.

Since the date of my last report the investigation then under way in connection with the alleged pollution of Lake Champlain and Boquet and Au Sable rivers has been completed and the report transmitted to the Governor, with the following conclusions and recommendations:

(1) The natural pollution from the population residing on the drainage areas of the Boquet and Au Sable rivers is not an important factor in the conditions complained of.

(2) The carbonate of lime, bleach-sludge, black-ash waste, etc., aggregating upward of 44,000 pounds per day or 15,000,000 pounds per annum (dry weight), discharged from the Willsboro mills of the New York and Pennsylvania Company are not properly retained in the present sludge basin, and this sludge basin is not constructed in accordance with the agreement entered into on February 12, 1901, between the New York and Pennsylvania Company and the State Forest, Fish and Game Commission, as a basis for the withdrawal of an action by the said commission against the said company.

(3) The effect of the black-ash waste, wood refuse and cinders which are discharged or allowed to escape from this mill appears to be confined mainly to the river at its mouth and to the lakeshore immediately adjacent, although the slow decomposition of the wood refuse undoubtedly contributes, along with the black-ash waste, to the stock of carbonic dioxide, which is the chief source of food for the vegetable life which thrives abundantly along the lakeshores.

(4) The large amount of carbonate of lime discharged from this mill in its impalpable form as a precipitated chemical appears to be carried to considerable distances from the mouth of the river and within the region of its transportation appears to impair the quality of the lake water for potable purposes.

(5) No fiber or pulp from the Willsboro mills was discovered in the lakeshore deposits, which form one of the chief grounds of complaint.

(6) The extensive accumulations and deposits of offensive material along the lakeshore at nearly all points examined are due to the decomposition of masses of aquatic micro-organisms—vegetable by classification—mainly consisting of different species of green algae and diatoms. The gray or whitish coating on the rocks and stones giving the light-banded appearance along the lakeshore above water line is due to the drying and bleaching out of this organic matter, intensified to some extent by mineral matter entrained by it, apparently silicious matter and carbonate of lime.

(7) Dr. Whipple sees no reason to believe that the waste products from the Willsboro mills contribute materially to the growth of the algae on the shores of the lake.

(8) The discharge of refuse suphite liquor, lost fiber and other wood waste from the sulphite pulp mills of the J. & J. Rogers Co. at Au Sable Forks, amounting to at least 171,000 pounds per day, or about 60,000,000 pounds per annum (dry weight), is the cause of serious pollution, not only in the Au Sable river, but in the lake.

(9) The pollution of the Au Sable river from the sulphite pulp mills at Au Sable Forks discolors the water, gives it a strong odor which is offensive to many people, fouls the banks, has seriously injured the public water supply of the village of Keeseville, and renders the river water generally unfit for domestic purposes.

(10) The refuse discharged into the river from the mills is, for the most part, carried into the lake partly throughout the year and partly at times of freshet. Settling and accumulating on the bottom, being mainly organic woody matter, it contributes materially by its decomposition to the stock of plant food for the algae and other micro-organisms, which form the chief ground of complaint concerning the lakeshore.

(11) The accumulations and deposits of decomposed organic matter along the lakeshore are detrimental, not only through the production of objectionable odors and the injury to the potability of the lake water when carbonate of lime deposits are washed up, but also in the serious defacement of the shore and of boats and docks.

(12) The discharge of all solid refuse from the Willsboro mills can be entirely avoided, without unreasonable cost, by either of two plans; first, by the reconstruction or improvement of its present sludge basin, rendering it watertight and safe against injury or inroads from high water and ice, so that the

basin should at all times remain crest full of liquid waste, thus giving an opportunity for complete sedimentation of the solid matters until the basin becomes nearly filled with solid matter, which it should do at the rate of upward of 8,000 cubic yards per annum. When this basin becomes filled with solid matter it would then be necessary to construct a new one. The second or alternate plan would be to reconstruct or improve the present sludge basin as in the above plan, but to relieve it of the burden of storing up the carbonate of lime, which represents by far the greater part of the refuse, by installing and operating at the mills a suitable process for the recovery of lime from the waste carbonate of lime. I do not know of any really serious obstacle to the use or success of such a process, which should, if reasonably successful, recover a large proportion of the lime needed for the causticising of the soda-ash, and at a cost not much, if any, greater, than for the present supply of lime, with the advantage of thus taking care of the enlarged item of refuse.

There may be obstacles or reasons against the introduction of this second plan of which I am not aware, but in any event the first plan is beyond question feasible.

(13) The discharge of refuse sulphite liquor, lost fiber and other wood waste from the sulphite mills at Au Sable Forks can also be avoided, and at a cost which, at the worst, would not be prohibitory. Even if the company should not succeed in developing a system whereby it might recover as waste products some of the woody materials now lost, it is still feasible to devise a system by which the refuse liquor may be evaporated and its solid constituents burned along with the other forms of wood waste, and at a cost which would not be prohibitory to operate.

(14) The discharge of sewage from the several municipalities on the lake and on its tributary streams constitutes an element in the development of the objectionable aquatic growths along the lakeshore, though less extensive than the discharge of pulp-mill refuse, and it also presents an element of danger to the potability of the water of the lake.

Recommendations.

(1) That the New York and Pennsylvania Co. be required under section 6 of the Public Health Law, or under other general authority to permanently discontinue and cease, within a reasonble length of time from the date of notification, the discharge or the escape from its Willsboro mills, of all lime-sludge, black-ash waste, lost fiber, wood waste, cinders and all other forms of pulp-mill waste, into the Boquet river or any tributary stream, or into Lake Champlain.

(2) That the J. & J. Rogers Co. be required under section 6 of the Public Health law, or under other general authority, to permanently discontinue and cease, within a reasonable length of time from the date of notification, the discharge or escape from its pulp and paper mills at Au Sable Forks, of all waste sulphite liquor and washings, and all lost pulp, wood waste, paper-mill waste, bleach sludge and all other forms of pulp-mill and paper-mill refuse, into the Au Sable river or tributary stream, or into any place where it may find its way into the said river or tributary stream.

(3) That in view of the importance of the purity of the waters and the shores of Lake Champlain and Lake George, the laws, regulations and authority of this Department, relating to the discharge of sewage into public waters, be strictly enforced with regard to these lakes and all tributary streams.

(4) That, if upon investigation by this Department, it shall be found that the pulp mills at Ticonderoga are discharging or are allowing to escape into any stream, pulp-mill refuse of any kind, the same orders be issued to the owners and operators of these mills as are recommended above for the Willsboro mills.

Sanitary Condition of the State.

Estimated by the death rate from all causes, the sanitary condition of the State for 1904 was unsatisfactory. There were 141,564 deaths reported, which is much in excess of previous records. (In 1901, the year of largest mortality heretofore recorded, there were 130,750 deaths.) The annual average mortality for the past twenty years, including 1904 (covering the period of the records of this Department), is 116,600. During this time the population of the State has increased from 5½ millions to 7¾ millions, and the mortalities of the earlier years have grown from about 100,000 to the present of about 130,000 for recent years—an increase of 29 per cent. in population, and of 23 per cent in mortality. The year 1904, however, with its excess of deaths, 15,000 more than have occurred in either of the two preceding years shows a death rate to population very nearly approximate to that of two decades ago.

Estimating, however, the sanitary condition of the State by the mortality from preventable diseases, that is, by the deaths from the common so-called zymotic or epidemic diseases, there is by no means a return to the condition of twenty years ago. In the first five years, 1885 to 1889, the percentage of zymotic deaths to the deaths from all causes was from 20.6 to 22.7. In the five years prior to 1904, in 126,000 deaths there were 16,800 zymotic deaths, or 13.3 per cent. of the total, which is a remarkable saving in the more readily preventable causes of death, and

relatively in this way, the percentage this year is still better, being 12.3 (compared with recent years, however, there was an absolute increase in the total zymotic mortality of 1,300; this however will to but a small degree account for the increased mortality of this current year).

Of epidemic diseases, cerebro-spinal meningitis and measles alone have shown any material increase. This was due to an outbreak of the former disease in the city of New York, beginning in March and continuing several months, whereby the mortality was increased from an average of about 500 for the year to 1,700. Measles has increased in the southern and eastern parts of the State, New York city having had nearly twice as many deaths from this cause as last year.

Typhoid fever has not had any unusual epidemic prevalence beyond a few minor outbreaks, and its total mortality is not far from the average. It is, however, one of the preventable diseases which should not maintain its average. There have been for years localities, of which Watertown and Niagara Falls are illustrations, where a high rate has been maintained needlessly. A purification of the water supply of these places is a necessity, for infected water is the predominant cause of this steady prevalence. The many summer resorts in this State also ought to be subjected to careful inquiry in this respect, and the resources of this Department might well be enlarged to meet this.

The chief cause for increase in the mortality of 1904 has however been in pneumonia. This alone caused 13,500 deaths, against 10,250 in the year preceding, bringing the mortality from acute respiratory diseases to over 21,000. These figures were nearly reached however in the years of largest prevalence of grippe

epidemics, 1891-3. This disease is largely the cause of this excessive mortality, which in the first five months of the year amounted to one-eighth of the total.

At the same time there were over 14,000 deaths from consumption, the mortality from which is also excessive in grippe epidemics, and this year exceeds any previous yearly record.

All local diseases (of the circulatory, nervous and urinary systems) were increased in their mortality.

Smallpox was moderately prevalent in mild form in various localities during the year, but only caused thirteen deaths, of which nine were in New York city. It is but little existent at the close of the year, and the widespread prevalence of it which began in 1898 and reached its highest in 1901 and 1902 has largely come to an end. This State is to-day much freer from smallpox than others about us, and this has been accomplished largely by persistent effort to secure general vaccination, and the beneficent though conservative laws of this State requiring it.

This Department is exceedingly gratified by the final trial of the constitutionality of our law requiring the vaccination of school children. This law which prohibits admission to the public schools of unvaccinated persons, having in a tested case passed through the lower courts, has had its validity affirmed during the year by the Court of Appeals. This decision is of exceeding interest to sanitary officers everywhere, and the opinion of the court, written by Judge Vann, is a most admirable presentation of the case in its various phases as it affects the best interests of every citizen. Quoting from it—" The question presented is whether the Legislature is prohibited by the Constitution from enacting that such children as have not been

vaccinated shall be excluded from the public schools. The appellant claims that the Public Health Law places an unreasonable restriction upon the right of his child to attend school, and that it violates the section of the Constitution already quoted, as well as the general guarantees for the protection of the rights, privileges and liberties of the citizen (Con., art. I, secs. 1 and 6). The respondents claim that the object and effect of such legislation is the protection of the public health, and that, hence, it is a valid exercise of the police power.

"When the sole object and general tendency of legislation is to promote the public health, there is no invasion of the Constitution, even if the enforcement of the law interferes to some extent with liberty or property.

"The appellant claims that vaccination does not tend to prevent smallpox, but tends to bring about other diseases, and that it does much harm with no good. It must be conceded that some laymen, both learned and unlearned, and some physicians of great skill and repute, do not believe that vaccination is preventive of smallpox. The common belief, however, is that it has a decided tendency to prevent the spread of this fearful disease and to render it less dangerous to those who contract it. While not accepted by all, it is accepted by the mass of the people, as well as by most members of the medical profession. It has been general in our State and in most civilized nations for generations. It is generally accepted in theory and generally applied in practice, but by the voluntary action of the people, and in obedience to the command of law. Nearly every State of the Union has statutes to encourage or, directly or indirectly, to require vaccination, and this is true of most nations of Europe. It is required in nearly all the armies and navies of the world.

"A common belief, like common knowledge, does not require evidence to establish its existence, but may be acted upon without proof by the Legislature and the courts. While the power to take judicial notice is to be exercised with caution and due care taken to see that the subject comes within the limits of common knowledge, still, when according to the memory and conscience of the judge, instructed by recourse to such sources of information as he deems trustworthy, the matter is clearly within those limits, the power may be exercised by treating the fact as proved without allegation or proof.

"The fact that the belief is not universal is not controlling, for there is scarcely any belief that is accepted by everyone. The possibility that the belief may be wrong, and that science may yet show it to be wrong, is not conclusive, for the Legislature has the right to pass laws which, according to the common belief of the people, are adapted to prevent the spread of contagious diseases. In a free country where the government is by the people through their chosen representatives, practical legislation admits of no other standard of action; for what the people believe is for the common welfare must be accepted as tending to promote the common welfare, whether it does in fact or not. Any other basis would conflict with the spirit of the Constitution and would sanction measures opposed to a republican form of government.

"While we do not decide, and cannot decide that vaccination is a preventive of smallpox, we take judicial notice of the fact that this is the common belief of the people of the State, and with this fact as a foundation we hold that the statute in question is a health law, enacted in a reasonable and proper exercise of the police power. It operates impartially upon all children

in the public schools and is designed not only for their protection, but for the protection of all the people of the State. The relator's son is excluded from school only until he complies with the law passed to protect the health of all, himself and his family included. No right conferred or secured by the Constitution was violated by that law or by the action of the school authorities based thereon."

FINANCIAL REPORT FROM OCTOBER 1, 1903, TO OCTOBER 1, 1904.

Salaries	$19,816 66
Bureau of Pathology and Bacteriology	1,978 07
Office expenses, printing, etc	4,462 42
Traveling expenses	2,058 12
Investigations	3,204 54
Cancer Laboratory	13,491 07
Antitoxin Laboratory	15,927 28
Consulting engineers	1,498 98
Bureau of Chemistry	1,086 40
Epidemics of smallpox and other contagious diseases	970 10
Purchase of building for Antitoxin Laboratory (chapter 728, Laws of 1904)	3,000 00
Total	$67,493 64

SEWER SYSTEMS.

During the past year, as provided by chapter 414 of the Laws of 1897, plans of proposed sewer systems and additions or changes in sewers already constructed, were approved for the following municipalities of the State:

Village of Baldwinsville.

Village of Canandaigua.

Village of Cold Spring.

Village of Cuba.

City of Cortland.

Village of Dansville.

Village of Dolgeville.

Village of East Syracuse.

City of Fulton.

Garden City, L. I. (Town of Hempstead.)

Village of Lestershire.

Village of Millbrook.

Village of Frankfort.

City of New Rochelle (additions).

Village of Owego.

Village of Seneca Falls.

Town of West Seneca.

Under chapter 468 of the Laws of 1903, permits were granted for the construction of sewers in the following cases:

Eastern Tannery Glue Co., Gowanda.

City of Auburn (2).

Harry T. Dayton, Auburn.

C. E. & E. A. Tuxill, Auburn.

Tuxill & Jones, Auburn.

Board of Education, Marathon.

Village of Stamford.

De Luval Separator Co., Poughkeepsie.

Borden's Condensed Milk Co., South Dover.

City of Lockport (3).

Chas. W. Doyle, Oriskany Falls.

Onondaga County Penitentiary.

Village of Canandaigua.

J. S. Kemp Mfg. Co., Newark Valley.

Village of Owego.

Abram Decker, Waverly.

St. Joseph's Church, Greenwich.

City of New Rochelle.

PROTECTION OF WATER SUPPLIES.

The continued occurrence of typhoid fever during the year in about the same degree as formerly, points unerringly to the impurity of the supplies of potable water in many sections of the State. This Department has employed every available resource for correcting these dangerous conditions.

In accordance with article V of the Public Health Law, rules for the protection of the sources of water supplies have been prepared and enacted by the Department, as follows:

City of Yonkers.

Village of Corinth.

The purity of the supply of the following municipalities has been investigated:

Albion.

Auburn.

Charlotte.

Chateaugay.

Chester.

Cold Spring.

Croton.

Fulton.

Highland Mills.

Hudson.

Lyons.

Mohawk.

Mt. Morris.

Mt. Vernon.

Plattsburg.

Port Chester.

Rome.

Sidney.

Syracuse.

Tarrytown.

Walton.

Waterford.

Waterloo.

Watertown.

Watervliet.

Webb—Big Moose Lake.

The supply of the Onondaga County Penitentiary and Racquette Lake have also been investigated.

The fact that nearly all of the above examinations were made upon the request of the local authorities indicates a much greater interest in the question of pure water than formerly. A large number of the towns and villages of the State, many of which are favorite summer resorts, have not seriously considered the terrible menace to the public health which a neglect of the condition of their water supplies implies, and there can be no adequate provision for the necessary control of such inspections and examinations by the State Department.

If through ignorance of the vital importance of a pure supply of potable water, or through delay or neglect to take proper

action for their protection against dangerous pollution, local authorities fail to do their duty, the State should have full power to compel such action.

This authority was sought from the Legislature of 1904, and an appropriation of $15,000 voted for this purpose, but failed of executive approval. There can be no expenditure of public money for sanitary purposes which would better conserve the interests of the people of this State than this line of investigation and the protection of the fresh waters of the State from contamination.

The purity of the milk supply of cities and towns is also intimately connected with the question of pure water, instances being on record where typhoid fever has been traced to the infected water used for the cleaning of cans and farm utensils by the milk dealer and producer.

The origin of epidemics, the mortality resulting therefrom and the gloomy record of the prevalence of many preventable diseases all call for active and unremitting work by the State Department of Health, and the financial support necessary for carrying forward these preventive measures should be in proportion to their importance. One million dollars would not be an excessive sum for the State to expend for the protection of the life and health of its inhabitants.

Respectfully submitted,

DANIEL LEWIS,

State Commissioner of Health.

APPENDIX

TWENTY-FIFTH ANNUAL REPORT

OF THE

STATE DEPARTMENT OF HEALTH.

Financial Report from October 1, 1903, to October 1, 1904.

SALARIES.

Commissioner of Health, salary and expenses......	$4,500 00
Secretary	2,500 00
Chief clerk....................................	2,400 00
Medical expert................................	1,500 00
Registrar of vital statistics......................	1,500 00
Stenographer	1,000 00
Supply and mailing clerk........................	1,400 00
Five clerks....................................	5,016 66
	$19,816 66

BUREAU OF PATHOLOGY AND BACTERIOLOGY.

1903.			
Oct.	1.	John J. White........................	$1 69
		John J. White........................	1 31
		F. M. West Box Co....................	44 95
		John G. Myers' Estate................	5 50
		Bausch & Lomb Optical Co............	13 50
		Eimer & Amend.......................	12 80
Nov.	25.	Eimer & Amend.......................	18 00
Dec.	29.	Walker & Gibson.......................	9 21
1904.			
Jan.	7.	Postage stamps.......................	15 00
	29.	United States Mailing Case Co.........	10 00
		Eimer & Amend.......................	4 00
		Eimer & Amend.......................	18 00
Feb.	29.	Eimer & Amend.......................	36 90
March	30.	Eimer & Amend.......................	11 55

April	13.	Bender Hygienic Laboratory...........	$800 00
	14.	Richard M. Pearce.....................	19 00
May	16.	Evening Union Co......................	2 75
June	16.	Postage stamps........................	30 00
July	7.	United States Mailing Case Co.........	7 20
	19.	Trustees of Bender Laboratory.........	400 00
Sept.	6.	Bender Hygienic Laboratory...........	400 00
		Bender Hygienic Laboratory...........	116 71
			$1,978 07

OFFICE EXPENSES.

1903.			
Oct.	1.	American District Telegraph Co........	$2 75
		Evening Union Co......................	49 26
		Western Union Telegraph Co...........	11 34
		Hudson River Tel. Co..................	29 90
		Postal Telegraph-Cable Co.............	4 03
		David B. McHanch......................	28 00
		G. A. Birch...........................	3 30
		Browne & Stuart.......................	22 50
		Fraser & Kelly........................	1 25
		Charles Croissant.....................	6 62
		Klips	5 00
		Evening Union Co......................	109 48
		Western Union Telegraph Co............	19 65
		Hudson River Telephone Co.............	21 60
		The Globe-Wernicke Co.................	17 50
		Evening Union Co......................	120 13
		Evening Union Co......................	13 46
		Medical Review of Reviews.............	1 00
		Postal Telegraph-Cable Co.............	4 49
		Klips	5 00
		G. A. Birch...........................	3 00
Nov.	10.	Klips	5 00
		Postal Telegraph-Cable Co.............	1 54
		T. S. Buck Mfg. Co....................	5 88
		Evening Union Co......................	517 27
		Evening Union Co......................	2 05

Nov.	10.	G. A. R. Birch	$3 15
		Lang Stamp Works	1 15
		Western Union Telegraph Co	12 59
		Hudson River Telephone Co	20 30
	25.	W. M. Thomas	228 00
		Browne & Stuart	190 00
		Smith Premier Typewriter Co	35 00
Dec.	15.	Postal Telegraph-Cable Co	2 41
		Klips	5 00
		G. A. Birch	2 50
		Hudson River Telephone Co	21 15
		Western Union Telegraph Co	26 04
		Munson Supply Co	5 00
		David B. McHench	28 00
	30.	T. S. Bick Mfg. Co	12 00
		Hudson River Tel. Co	16 80
		Engineering News Publishing Co	5 00
		Evening Union Co	25 51
1904.			
Jan.	5.	G. P. Putnam's Sons	1 90
		Postal Telegraph-Cable Co	1 80
		Klips	5 00
		G. A. Birch	3 15
	28.	Evening Union Co	5 25
		Browne & Stuart	11 25
		T. S. Buck Mfg. Co	3 82
		A. N. Bell	4 00
		Charles Croissant	2 12
		John G. Myers' Estate	1 40
		Capital City News Co	6 00
		Western Union Tel. Co	16 00
		Hudson River Telephone Co	14 65
		Evening Union Co	309 91
		Browne & Stuart	142 50
		Albany Medical Annals	1 00
	30.	Klips	5 00
		G. A. Birch	3 05
Feb.	9.	Postal Telegraph-Cable Co	3 92
		T. S. Buck Mfg. Co	1 19

Feb.	9.	Western Union Telegraph Co...........	$12 34
	29.	G. A. Birch..........................	2 90
		Hudson River Tel. Co.................	24 25
		Fraser & Kelly.......................	9 98
		Lemcke & Buechner....................	5 00
		Evening Union Co.....................	117 93
		Evening Union Co.....................	18 27
		Elizabeth A. Carroll.................	4 00
		Marshall Coe.........................	10 00
		Postal Telegraph-Cable Co............	5 06
		Klips	5 00
March	9.	E. B. Estes & Sons...................	3 50
		Western Union Tel. Co................	18 70
	30.	The Globe-Wernicke Co................	15 00
		Oliver A. Quayle.....................	27 75
		Evening Union Co.....................	128 27
		Chas. E. Thompson....................	5 00
		F. D. Sargent........................	18 25
		Hudson River Telephone Co............	12 85
April	7.	John G. Myers' Estate................	1 02
		Chas. E. Filkins.....................	7 10
	13.	Klips	5 00
		Postal Telegraph-Cable Co............	5 72
		G. A. Birch..........................	3 15
		Hudson River Tel. Co.................	27 15
		Western Union Telegraph Co...........	6 99
	25.	The Engineering Record...............	3 00
		J. A. Egan...........................	10 00
		Browne & Stuart......................	95 00
		Evening Union Co.....................	42 33
May	16.	Western Union Telegraph Co...........	5 59
		Philip J. Henzel.....................	8 00
	17.	Evening Union Co.....................	383 83
		Lea Brothers & Co....................	5 75
	18.	Hudson River Tel. Co.................	22 40
		G. A. Birch..........................	3 05
		Klips	5 00
		Postal Telegraph-Cable Co............	6 43
	31.	G. A. Birch..........................	2 95

May	16.	Hudson River Tel Co	$24 22
		J. Archibald Clark	12 75
		Smith Premier Typewriter Co	90 00
		Klips	5 00
		Evening Union Co	362 41
		Fraser & Kelly	4 88
		Browne & Stuart	114 00
		Postal Telegraph-Cable Co	6 01
July	7.	Klips	5 00
		Postal Telegraph-Cable Co	2 72
		Western Union Telegraph Co	12 88
		Fraser & Kelly	2 56
		G. A. Birch	3 00
		E. B. Estes & Sons	3 10
		Sampson & Murdock Co	4 00
		Hudson River Telephone Co	15 75
	11.	Western Union Telegraph Co	6 68
	15.	J. A. Vaughan	50 00
	27.	Capital City News Co	6 00
		Evening Union Co	85 90
		G. W. Littlejohn	25 00
	28.	Evening Union Co	99 85
		W. F. Anteman & Son	30 00
		Klips	5 00
Aug.	26.	E. B. Estes & Sons	2 50
		Postal Telegraph-Cable Co	5 76
		G. A. Birch	3 05
		Evening Union Co	75 33
		Western Union Telegraph Co	7 71
		Hudson River Telephone Co	14 80
	31.	G. A. Birch	3 15
		Klips	5 00
Sept.	6.	Hudson River Telephone Co	23 65
		Postal Telegraph-Cable Co	4 40
		Western Union Tel. Co	11 01
	7.	David B. McHench	42 00
			$4,462 42

TRAVELING EXPENSES.

1903.			
Oct.	1.	William E. Johnson	$97 03
		Herbert D. Pease	6 31
		J. James R. Croes	25 18
		Olin H. Landreth	271 21
		F. C. Curtis	10 66
		Herbert D. Pease	18 59
		Wm. E. Johnson	156 38
		T. A. Stuart	10 33
		Wm. B. Landreth	11 06
		Gary N. Calkins	25 30
		Jno. P. Martin	15 65
Nov.	10.	B. T. Smelzer	63 25
		Wm. E. Johnson	47 60
		Herbert D. Pease	55 15
	11.	T. A. Stuart	36 17
Dec.	15.	Wm. E. Johnson	45 74
	29.	J. James R. Croes	59 79
	30.	F. C. Curtis	20 30
1904.			
Jan.	5.	Wm. E. Johnson	$105 29
		Herbert D. Pease	59 92
	31.	Wm. E. Johnson	42 55
Feb.	3.	Herbert D. Pease	34 85
	9.	Gary N. Calkins	22 50
	29.	Wm. E. Johnson	35 10
March	28.	Geo. H. Carroll	4 97
		Peter A. Ward	23 16
		E. W. Carroll	9 06
		B. M. Allair	9 00
		Joseph H. Nellis	14 12
		Geo. H. Carroll	5 09
		Peter A. Ward	25 35
		Wm. S. Ward	6 84
		B. M. Allair	13 51
		John C. Montgomery	16 17
		Joseph H. Nellis	12 40
		E. W. Carroll	16 61

March	30.	H. R. Gaylord	$18 20
		Richard M. Pearce	2 80
April	7.	Wm. E. Johnson	92 92
	25.	Gary N. Calkins	22 50
May	16.	Wm. E. Johnson	74 48
	31.	Wm. E. Johnson	122 57
		F. C. Curtis	51 68
July	7.	Wm. E. Johnson	22 55
		T. A. Stuart	11 75
	30.	Wm. E. Johnson	83 42
Aug.	29.	T. A. Stuart	26 38
Sept.	6.	Wm. E. Johnson	73 58
	12.	T. A. Stuart	23 10
			$2,058 12

INVESTIGATIONS.

1903.			
Oct.	1.	Postage stamps	$210 00
		Evening Union Co	12 50
		Willis G. Tucker	245 00
		The Whitehead & Hoag Co	46 00
		J. James R. Croes	135 00
		Olin H. Landreth	725 00
		United Traction Co	18 00
		Harris' Livery	6 00
		Albany Calcium Light Co	8 00
		John S. Fulton	23 15
		F. C. Curtis	30 00
		H. J. Rockwell & Son	35 45
		W. A. Evans	100 00
		Allen Hazen	9 45
		Willis G. Tucker	125 00
		John P. Martin	155 00
Nov.	10.	B. T. Smelzer	127 50
	25.	The Argus Co	356 86
Dec.	29.	J. James R. Croes	180 00
	30.	F. C. Curtis	50 00
1904.			
Feb.	11.	Geo. A. Soper	249 13

March	28.	Geo. H. Carroll	$21 00
		Peter A. Ward	30 00
		E. W. Carroll	12 00
		B. M. Allair	30 00
		Joseph H. Nellis	18 00
		Geo. H. Carroll	21 00
		Peter A. Ward	37 50
		Wm. S. Ward	4 50
		B. M. Allair	30 00
		John C. Montgomery	12 00
		Joseph H. Nellis	16 50
		E. W. Carroll	21 00
	30.	Richard M. Pearce	15 00
May	31.	F. C. Curtis	100 00
			$3,204 54

CANCER LABORATORY.

1903.			
Oct.	1.	Roswell Park, sundry accounts (Aug.)	$132 91
		Roswell Park, sundry accounts (Sept.)	451 69
	31.	Pay-roll for October	726 65
		Roswell Park, sundry accounts	178 79
Nov.	30.	Pay-roll for November	789 98
		Roswell Park, sundry accounts	114 89
Dec.	31.	Pay-roll for December	772 98
		Roswell Park, sundry accounts	724 11
1904.			
Jan.	31.	Pay-roll for January	772 98
		Roswell Park, sundry accounts	177 55
Feb.	29.	Pay-roll for February	772 98
		Roswell Park, sundry accounts	139 12
March	31.	Pay-roll for March	772 98
		Roswell Park, sundry accounts	583 93
April	30.	Pay-roll for April	772 98
		Roswell Park, sundry accounts	237 13
May	31.	Pay-roll for May	707 98
		Roswell Park, sundry accounts	213 45
June	30.	Pay-roll for June	792 98
		Roswell Park, sundry accounts	431 10

July	31.	Pay-roll for July	$792 98
		Roswell Park, sundry accounts	510 33
Aug.	31.	Pay-roll for August	806 64
		Roswell Park, sundry accounts	302 98
Sept.	30.	Pay-roll for September	810 98
			$13,491 07

ANTITOXIN LABORATORY.

1903.			
Oct.	31.	Pay-roll for October	$564 98
		Sundry accounts for October	1,191 37
Nov.	30.	Pay-roll for November	564 98
		Sundry accounts for November	521 01
Dec.	31.	Pay-roll for December	619 24
		Sundry accounts for December	399 07
1904.			
Jan.	31.	Pay-roll for January	624 97
		Sundry accounts for January	709 77
Feb.	29.	Pay-roll for February	624 97
		Sundry accounts for February	868 99
March	31.	Pay-roll for March	629 97
		Sundry accounts for March	418 88
April	30.	Pay-roll for April	629 97
		Sundry accounts for April	436 45
May	31.	Pay-roll for May	629 97
		Sundry accounts for May	696 09
June	30.	Pay-roll for June	609 97
		Sundry accounts for June	328 78
July	31.	Pay-roll for July	647 47
		Sundry accounts for July	416 96
Aug.	31.	Pay-roll for August	634 97
		Sundry accounts for August	650 04
Sept.	30.	Pay-roll for September	635 21
		Sundry accounts for September	1,873 88
			$15,927 88

CONSULTING ENGINEERS.

1904.		
Feb. 29.	Olin H. Landreth	$155 00
May 31.	Olin H. Landreth	300 00
July 12.	Olin H. Landreth	400 00
30.	J. James R. Croes	643 98
		$1,498 98

BUREAU OF CHEMISTRY.

1903.		
Dec. 15.	Willis G. Tucker	$140 00
1904.		
Jan. 5.	Willis G. Tucker	30 00
Feb. 9.	Willis G. Tucker	133 00
29.	Willis G. Tucker	157 10
April 7.	Willis G. Tucker	115 00
May 16.	Willis G. Tucker	120 00
31.	Willis G. Tucker	245 00
July 7.	Willis G. Tucker	146 30
		$1,086 40

POSTAGE AND EXPRESSAGE.

Postage	$1,134 08
Expressage	147 58
	$1,281 66

SMALLPOX EPIDEMICS.

1903.		
Dec. 15.	Elmer E. Larkin	$127 28
1904.		
Jan. 5.	E. E. Larkin	75 00
30.	E. E. Larkin	135 00
Feb. 17.	A. G. Wilding	304 68
29.	E. E. Larkin	136 58
April 7.	E. E. Larkin	41 56
July 15.	G. C. Whipple	150 00
		$970 10

PURCHASE OF BUILDING FOR ANTITOXIN LABORATORY.

1904.		
July 13.	Genevera L. King	$3,000 00

BUREAU OF VITAL STATISTICS.

February 9, 1905.

Hon. Daniel Lewis, *Commissioner of Health, Albany, N. Y.*

Sir—I respectfully render the following report for your consideration covering the work in the Bureau of Vital Statistics for the year of 1904:

The number of local boards of health in the state (outside of Albany, Buffalo, Greater New York and Yonkers) directly under the jurisdiction of the State Department of Health are: Town, 932; Village, 433; City, 41—total, 1,406. This is an increase of 11 over last year.

During the year the local boards were kept supplied with registration blanks, and copies of the amendments to the Public Health Law relating to the filing of given-name cards for birth certificates filed with that omission; and the amendment placing upon the municipalities the expense incurred by the Department where it is necessary to send a representative to take charge of the registration of vital statistics, in order to secure complete registration, were mailed to each of the local boards.

REPORTS FROM LOCAL BOARDS.

There were 17,314 reports of vital statistics received from the local boards of health during the year, as against 17,120 filed for the year of 1903, an increase of 194.

CITY REGISTRATION.

The following table shows the registration of births, deaths and marriages in the cities of the state, and the birth and death rate per 1,000 population; as is also given the rate for the previous year:

CITY.	Population.	Births.	Deaths.	Marriages.	Rate per 1,000 Population. 1904. Birth.	1904. Death.	1903. Birth.	1903. Death.
Albany	*100,000	1,381	†1,813	641	13.8	18.1	14.2	18.0
Amsterdam	*20,929	417	357	164	19.9	17.1	19.4	19.1
Auburn	*35,000	574	475	276	16.4	13.5	16.0	14.8
Binghamton	*40,000	568	658	886	14.2	16.4	13.9	13.3
Buffalo	*380,000	7,884	5,724	3,722	20.7	15.0	19.3	15.3
Cohoes	24,000	374	459	61	15.5	19.1	22.0	19.3
Corning	11,061	182	202	196	16.5	18.3	17.1	15.2
Cortland	9,014	155	152	87	17.2	16.8	15.7	18.6
Dunkirk	*15,000	458	263	165	30.5	17.5	37.9	19.8
Elmira	35,672	501	553	598	14.0	15.5	13.5	14.2
Fulton	*8,734	145	123	78	16.6	14.0	14.1	16.6
Geneva	10,433	160	182	99	15.3	17.4	22.3	16.7
Gloversville	18,349	278	258	166	15.1	14.1	15.4	15.7
Hornellsville	12,000	219	205	135	18.3	17.1	18.1	16.0
Hudson	9,528	166	208	102	17.4	21.8	18.6	18.8
Ithaca	13,136	197	232	136	15.0	17.6	13.6	20.5
Jamestown	22,892	455	327	720	20.0	14.2	20.1	13.4
Johnstown	10,130	197	125	75	19.3	12.3	15.4	15.4
Kingston	24,535	493	452	239	20.0	18.5	19.1	17.4
Little Falls	10,381	175	144	59	16.8	13.8	17.0	11.2
Lockport	16,581	306	289	169	18.5	17.4	19.5	17.4
Middletown	14,522	231	253	155	15.9	17.4	12.5	13.8
Mt. Vernon	20,346	787	353	223	38.6	17.3	28.1	13.9
Newburgh	25,000	541	532	227	21.6	21.3	17.2	19.0
New Rochelle	14,720	395	274	162	26.7	18.6	29.4	14.1
New York (Greater)	*3,838,024	99,555	‡77,985	39,436	25.9	20.3	25.3	18.1
Niagara Falls	*25,000	472	418	464	18.9	16.7	23.5	19.1
North Tonawanda	9,069	210	130	140	23.2	14.3	18.8	11 6
Ogdensburg	12,633	247	245	148	19.6	19.4	17.5	18.3
Olean	9,462	194	138	240	20.5	14.5	20.4	10.8
Oneida	7,942	145	113	72	18 2	14.2	15.6	13.9
Oswego	22,200	377	391	139	17.0	17.6	15.5	14.6
Plattsburgh	8,434	146	153	145	17.3	18.1	23.2	15.6
Poughkeepsie	24,029	473	524	265	19.7	21.7	20.3	19.2

Rensselaer	*10,000	141	167	109	14.1	16.7	16.0	22.6
Rochester	*165,000	3,321	2,581	1,724	20.1	15.6	18.7	15.1
Rome	15,343	349	317	103	22.8	20.7	20.9	19.8
Schenectady	*56,000	1,305	791	432	23.3	14.1	17.0	16.7
Syracuse	*110,000	1,838	1,750	787	16.7	15.9	15.5	14.9
Tonawanda	7,421	140	89	84	18.8	12.0	17.9	12.8
Troy	*75,000	936	§1,646	506	12.5	22.0	11.4	19.3
Utica	56,383	1,161	1,143	396	20.6	20.3	20.3	17.1
Watertown	21,700	422	416	232	19.4	19.1	16.8	15.6
Watervliet	14,321	188	230	53	13.1	16.0	9.2	16.6
Yonkers	*50,000	1,338	1,005	560	26.6	20.1	24.0	16.8

*Estimated. †Includes 129 non-residents, making city death rate, 16.8. ‡Includes 974 non-residents, making city death rate 20.0. §Includes 244 non-residents, making city death rate 18.7.

From the above table it will be seen that the following cities report a smaller number of births than deaths registered for the year, which shows that the registration of births in these cities is far from being complete, particularly in the cities of Cohoes, Troy and Watervliet: Albany, Binghamton, Cohoes, Corning, Elmira, Geneva, Hudson, Ithaca, Middletown, Oswego, Plattsburg, Poughkeepsie, Rensselaer, Troy and Watervliet. In other cities it will be noticed that the registration is unsatisfactory.

There has been a noted improvement in the registration of births in the city of Schenectady, 119 delayed certificates having been filed during the year, which are not included in the above table.

While the registrar of the city of Rensselaer was unable to secure complete registration for the year just closed, he succeeded in having filed 222 delayed certificates of births occurring in previous years.

COUNTRY REGISTRATION

The registration of births in the country districts is as unsatisfactory as in the cities. Many of the local registrars report a smaller number of births than deaths, and during the year no birth certificates were received from the following places: Town of Amboy, Oswego county; village of Andes, Delaware county; town of Gardiner, Ulster county; town of Newcomb, Essex county; town of North Hudson, essex county; village of Oneida Castle, Oneida county; village of Turin, Lewis county; town of White Plains, Westchester county. The towns of Newcomb and White Plains failed to report either a birth or death during the year.

During the past three years the Department has had more or less correspondence with local boards, insisting upon a complete registration of vital statistics, and while there has been some improvement in the registration of births and marriages, it is far from being as complete as that of deaths, and it would seem that the only way the registration can be made complete is to have a representative of the Department visit the places where defective registration is known to exist and take charge of the local registration until satisfied that the local authorities will comply with the Public Health Law in this respect.

CERTIFICATES FILED IN THE BUREAU.

The certificates filed with the Department from the registration districts in the state, outside of the cities of Albany, Buffalo, New York and Yonkers, were as follows:

MONTH.	Births.	Deaths.	Marriages.
January	3,890	4,772	2,200
February	4,153	5,074	1,971
March	4,839	5,910	1,691
April	4,339	5,208	2,098
May	4,855	4,682	1,844
June	4,521	3,935	3,182
July	4,522	4,289	2,292
August	4,812	4,469	2,193
September	4,987	4,195	2,764
October	5,385	4,214	3,146
November	4,721	4,045	2,759
December	4,052	4,396	2,906
*Total	55,076	55,189	29,046
Filed in 1903	52,610	51,181	29,305
Increase	2,466	4,008	†259

Net increase, 6,215.
*139,311. †Decrease.

It will be readily seen from the above that the Department did not receive anywhere near the number of birth certificates that should have been recorded for the year.

TOTAL REGISTRATION IN THE STATE.

The complete registration of vital statistics in the state as reported for the year was as follows:

MONTH.	Births.	Deaths.	Marriages.
January	12,289	11,689	6,888
February	12,283	12,460	5,552
March	14,771	15,463	4,596
April	12,857	13,322	5,651
May	12,642	11,786	4,731
June	14,773	11.932	8,444
July	13,616	11,492	5,664
August	15,532	11,973	5,591
September	14,167	9,913	6,396
October	14,576	9,515	7,208
November	14,830	11,066	7,736
December	12,678	10,752	6,220
Total	165,014	141,363	74,677

The above figures show a birth rate of 21.2 per 1,000 population; death rate, 18.2; marriage, 9.6.

CITY AND RURAL RATE.

The registration of vital statistics as reported from the cities, towns and villages in the state show the following rates:

Birth — City,		24.0;	County,	18.4
Death	"	19.3;	"	17.1
Marriage	"	10.2;	"	9.0

DEATH RATE IN STATE INSTITUTIONS.

The following table shows the death rate per 100 population in the State Institutions for the year, as is also given the rate for 1903:

INSTITUTIONS.	Inmates.	Deaths.	Death rate. 1904.	Death rate 1903.
Auburn State Prison	1,088	15	1.37	1.16
Binghamton State Hospital	1,400	132	9.43	6.79
Bloomingdale Asylum*	327	21	6.40	9.48
Buffalo State Hospital	1,634	130	8.00	9.90
Clinton Prison	1,019	13	1.27	1.16
Craig Colony	837	47	5.61	5.77
Dannemora State Hospital	227	3	1.32	2.50
Eastern New York Reformatory, Napanoch	411	3	0.73	1.32
Elmira Reformatory	1,387	13	0.94	1.00
Gowanda State Hospital	711	36	5.06	3.72
Hudson River State Hospital	2,162	186	8.60	8.32
Long Island State Hospital:				
Kings Park	2,758	232	8.41	6.56
Brooklyn	1,197	73	6.10	7.00
Manhattan State Hospital:				
East	1,957	222	11.35	12.56
West	2,254	174	7.71	7.71
Central Islip	3,535	240	6.78	6.38
Matteawan State Hospital	599	21	3.50	3.55
Middletown State Hospital	1,308	84	6.42	4.05
New York Soldiers' Home, Bath	1,785	165	9.24	8.00
Rochester State Hospital	687	102	14.85	12.10
St. Lawrence State Hospital	1,717	135	7.90	8.00
Sing Sing Prison	1,209	10	0.82	0.84
State Prison for Women, Auburn	99	6	6 00	1.80
Utica State Hospital	1,102	105	9.52	8.60
Willard State Hospital	2,225	136	6.11	5.85

*Private.

The above shows an average death rate in the institutions for the year of 6.85 per 100 population.

DELINQUENT REGISTRARS.

During the year the Department has had more trouble in getting reports from chronic delinquent registrars than during 1903, over two hundred notices being mailed each month to local registrars failing to make their reports promptly.

At the close of the year the following boards were back more than one month in their reports: Town of Caneadea, Allegany county, 3 months; town of Jay, Essex county, 3 months; village of Tuckahoe, Westchester county, 2 months; town of Ulster, Ulster county, 3 months; town of Webb, Herkimer county, 5 months; village of Youngstown, Niagara county, 2 months.

In view of the above facts, the Department is fully justified in strictly enforcing the Public Health Law, and the rules and regulations of the Department covering the registration of vital statistics, even though the municipalities be put to the expense of a representative taking charge of the registration.

DEFECTIVE CERTIFICATES.

During the year there were returned for correction 1,756 defective certificates, as follows: Birth, 599; death, 722; marriage, 435. This is 508 more than were returned during 1903.

TRANSCRIPTS.

There were 460 written requests received during the year for transcripts of certificates, as against 390 received during the previous year—an increase of 70.

EXPRESS AND MAIL MATTER.

The express matter sent out from the Department during the year was:

Annual reports	1,835
Supplies, etc	1,892
	3,727

The following represents the mail matter outside of the regular correspondence of the Department:

Blanks sent to local boards of health for membership of same	1,406
Returned for correction	468
Cards and envelopes for returns of vital statistics (parcels)	1,406
Reports of vital statistics acknowledged	17,314

Copies of amendments to Public Health Law	1,422
Copies of Health Law Manual	1,244
Notices of Annual Conference	1,422
Certificates returned for correction	1,756
Delinquent notices mailed to registrars	2,429
	28,867

Still-birth certificates returned and other matter not accounted for would make the total number of pieces sent out by mail about 30,000.

INDEX WORK.

The number of certificates indexed and properly filed during the year was:

Birth	41,069
Death	44,542
Marriages	28,864
	114,475

Index cards covering same:

Birth	45,275
Death	48,996
Marriage	60,614
	154,885

Respectfully submitted.

F. D. BEAGLE,
Registrar of Vital Statistics.

SANITARY CONDITION OF THE STATE

AND

SUMMARY OF MORTALITY REPORTED DURING THE YEAR.

Sanitary Condition of the State and a Summary of Mortality Reported During the Year 1904.

By F. C. Curtis, M. D.

There were 141,564 deaths in this State during 1904, as recorded in the Central Bureau of Vital Statistics. This includes 260 delayed returns, and by that number exceeds the total as printed in the *Monthly Bulletin* of mortality. The number of delayed returns is smaller than usual by reason of a somewhat larger number of returns being included in the monthly issues of the *Bulletin* of deaths occurring prior to the month of issue; for a number of years, however, they have been so included, the reported mortality for each month covering by this means a period a little prior to the commencement of the month. This, however, does not affect the total for the year as thus given, which represents the entire mortality of the year. In 1903 there were 578 delayed returns, which increased the mortality of the *Bulletin* for that year to 127,114. 4,966 deaths were included in the *Bulletin* issues for 1904, which occurred prior to the dates of issue (4,291 in 1903). The actual mortality exceeds that of 1903 by 14,450.

There was a death rate of 18.2, against an average death rate for the preceding five years of 17.2. There were 380 deaths a day on an average through the year, against 350 in 1903. The year was throughout one of large mortality, but the winter and spring months were especially so, exceeding even that of midsummer; the deaths of July, when the diarrheal mortality causes ordinarily the highest mortality of the year, being actually fewer than occurred in either of the first five months. In March there were over 14,000 deaths, a number never before reached in any month of the year.

The deaths and classified causes are given for each month in the following table; succeeding which are tables giving the mortality by sanitary districts, and the comparative proportion of deaths at certain ages and from important causes, together with the urban and rural mortality.

The high mortality of the early part of the year was largely due to *pneumonia.* In the first five months there were 8,000 deaths from this cause, 2,000 more than occurred during the same months of 1903, one eighth of the deaths during the period being from this cause. In March, when the great mortality of the year occurred, 2,000 deaths were due to pneumonia. For the year not less than 9 per cent. of the deaths of the State were from pneumonia, and in the Maritime district, where the proportion was highest, it reached 11 per cent., and almost two deaths per thousand population. The large increase in acute respiratory mortality in the early part of the year was undoubtedly due to *grippe.*

Consumption caused over 14,000 deaths, or 10 per cent. of the total, and two deaths per thousand population, the mortality being a little greater than from pneumonia (628.) There were from 1,000 to 1,400 deaths each month of the year, so that, while most fatal in the spring months, there is no month which fails of a close approach to the average mortality. In the last twenty years there have been 259,000 deaths from consumption in this State, and in each year there has been a mortality of 12,000 to 14,000, with little variation, from an average of 13,000 deaths a year.

Epidemic diseases caused 18,112 deaths, or 12.8 per cent. of the total, the same as in 1903. This entire group caused but a moderately larger mortality than either consumption or pneumonia.

Diarrheal deaths constitute nearly one half of this number, 8,329. This is just the average yearly mortality recorded from this cause. It includes the deaths only from acute diarrheal diseases. Prior to 1904 these were included without regard to age; this year only deaths under five years of age were recorded, and that the record for the year comes closely to the average of past years indicates that at least the great portion of the large mortality from this cause occurs under the age of five years, and that the number above that is practically negligible for statistical

purposes. Compared with 1903, when the total of epidemic diseases was the same as this year, the reported diarrheal mortality is greater this year by 800. But the 1903 diarrheal mortality was exceedingly light; that of the two preceding years was equal to or greater than that of this year. The mortality under the age of five years was 6,000 greater this year than in 1903. Outside of New York and Buffalo there were 300 deaths from diarrheal diseases above the age of five years in the three summer months. It is probable that if the diarrheal mortality had included all regardless of age that the total would have been about 9,000.

Cerebrospinal meningitis began in March an epidemic prevalence in New York city which reached its height in May, but, with the exception of January and February, the mortality was excessive throughout the year, with a total of 1,700 deaths, which is thrice the average. There were 1,432 deaths from it in the Maritime district, all parts of which participated in the increase. The Hudson valley and Mohawk valley districts also had an increased number of deaths from cerebrospinal meningitis, their increase coming later in the year; the rest of the State showed no participation, at least during 1904.

Diphtheria caused the average number of deaths of recent years, 3,000. During the twelve years prior to 1897 there were 5,500 deaths a year from diphtheria; during the last eight years following that period there have been 3,100 deaths a year. Indeed, excluding 1897, there have been less than 3,000 deaths a year, the annual mortality varying from 2,600 to 3,300; during the earlier period it ranged from 4,600 to 6,600 deaths. It has proved to be a preventable disease to the extent of saving 2,500 lives a year, not taking into account an increase in population of one and one half million.

Typhoid fever has continued to have a little varying annual mortality. In the last twenty years there have been 1,600 deaths on the average every year, and the 1,652 deaths this year are fully up to that. There are never so many as 2,000 deaths and never so few as 1,300. In not a few localities a former high mortality has been greatly reduced permanently by purification of the water supply, but many still continue. Our average mortality for twenty years has been about 25 deaths per 100,000 population

annually, or nearly that. This has been 13 deaths to each 1,000 deaths from all causes, 1.3 per cent., which is a little above the deaths of this year, 1.2 per cent. There are certain localities in the State which have persistently a death rate from typhoid fever of from 50 to 100 deaths per 100,000 population; these are being reached as fast as possible. The prime cause of this disease is infection of the public water supply, which finds its chief measure of purity in the prevalence of it. In the Maritime district less than 1 per cent. of the deaths were from typhoid fever; in the rest of the State, 1.6 per cent.

Scarlet fever this year comes next in the numerical order of mortality among the epidemic diseases, 1,200 deaths. This disease has periods of prevalence and of abeyance. For six years, 1895-1900, there were less than 800 deaths a year from it. In 1901 it rose abruptly from the lowest mortality in twenty years to 1,400 deaths, and since has been having higher rates. It is widely distributed, is very prevalent in mild form, and is believed now to be having very low rate of mortality relatively to morbidity. Of this we cannot give statistics worth making, since while there are many cases reported, and from some localities faithfully, we are aware that the majority of cases of the disease fail of report to the central office.

Measles had, in 1904, nearly the same mortality as scarlet fever, 1,170. It likewise has periods of prevalence and of subsidence; the three years prior to this had 800 deaths a year, which is about the number of subsidence periods, whereas 1,200 is about the range of the years of greater prevalence. Both of these diseases cause their largest mortality in the first five months of the year, and chiefly in the spring months.

Whooping cough had an unusually low mortality this year, 426, less than half the average. It has not been so notable as has generally been the case in past years that its highest mortality has come in the summer months, contrary to the general statement that it is a disease fatal in the winter and spring. It will be found, undoubtedly, that August has a larger mortality in this State from whooping cough than any other month in the year.

Smallpox caused 13 deaths, a smaller number than since 1898, when in May it began to be widespread. In the two years, 1901

and 1902, there were about 450 deaths each, dropping to 41 in 1903. There were this year only 4 deaths outside of the Maritime district, although the disease prevailed in numerous regions of the State, notably in Saratoga, Washington and Rockland counties.

Malarial diseases contributed little to the mortality this year, and for the past two years. There has been a rather steady decrease in the number of deaths attributed to this cause; possibly it has been due in part to discretion in the use of this term as a cause of death or death certificates and in the classification. The average yearly mortality reported from it in the last decade has been 300; in the preceding decade it was over 700.

The infant mortality was large compared with recent time; there were 6,000 more deaths under five years of age than in 1903 and 3,500 more than the average for the past five years. But relatively the infant mortality is much lower than it was years ago. The average of the past twenty years is 32.5 per cent. of the total mortality; that of the past five years is 27.5 per cent., which is that of this year. There were 25,000 deaths under one year of age, 17.5 per cent. of the total mortality; 14,000, or 10 per cent. of the total, between one and five years of age. More than half the deaths of July were under the age of five years.

In the Maritime district 34 per cent. of the deaths of the year were at age of five years or under, of which 20.5 per cent. were under one year of age and 13.5 per cent. between one and five. There is a very much greater difference in this metropolitan district in the mortality at these two ages of early life than in the rest of the State, where less than 5 per cent. of the deaths occurred between ages 1-5 years, 13 per cent. having been under one year of age. Buffalo, to a much less degree, shows the relatively large mortality of early childhood as compared with that of infancy under urban conditions as contrasted with those more rural. In the West Central district there were but 162 deaths, or 3 per cent. of the total, between ages 1-5 years, and 460, or 9 per cent., under one year of age, almost three times as many as occurred at the older child age. In the metropolitan district there were 11,300 deaths between ages 1-5 years and 17,150 under one year of age; 40 per cent. of the childhood mortality being at age 1-5 years, against 26 per cent. in this rural district.

The contrasts in age mortality between urban and rural districts is much more marked in the deaths at *advanced age.* In the Maritime district 10.5 per cent. of the deaths occurred at 70 years of age and over, while in the rest of the State nearly 30 per cent. were at this age. In the West Central district 37 per cent. of the deaths were at age 70 years and over.

In the tables which follow, the relative mortality not only of ages but of causes will be found, for the districts into which the State has been divided. Epidemic disease as a whole, consumption, pneumonia and Bright's disease caused the largest proportion of deaths in the Maritime district. Of epidemic diseases, diphtheria, scarlet fever and diarrheal diseases were higher in this district than in the rest of the State, and typhoid fever was lower. Consumption was lowest of any of the districts in the Southern Tier district, and this is true every year, being partly less relatively as to some of them because it has within it no large resorts for consumptives, as are in the Adirondack and East Central districts. Pneumonia far exceeds in the mortality of the Maritime district the rest of the State, and this was likewise true in 1903. The same is true as to both years regarding Bright's disease, which this year caused 6.2 per cent. of the deaths of the State, against 6 per cent. in 1903.

Local diseases caused a large part of the increased mortality of 1904, excepting the digestive system, which is below the average of the past five years. The deaths from diseases of the urinary, circulatory and nervous systems were from 1,000 to 2,500 in excess of the recent average. They were increased during the excessively high mortality of the early months of the year. *Grippe* caused a good part of the increased mortality and it caused, no doubt, much of this increase in local diseases.

Accidents and violence had a very high mortality, 1,700 in excess of the average of recent years. More than 1,000 of these deaths were due to the "Slocum" disaster in the East river in June. But aside from this extraordinary contribution to this class of mortality, the number of deaths from accidents and violence is large; deducting it, there have been in the last five years 7,400 deaths a year, while in the first five years of our twenty-year period (1885-89) the annual deaths were 3,500. In the ten years, 1885-94, there were 4,364 deaths from accidents and violence yearly and in the ten years, 1895-1904, there were 6,986.

A very large number of these deaths have been from railroad accidents, but what proportion of these have caused the increase data is not at hand to state.

Old age as a cause of death appears to be less used than in earlier years. The average yearly mortality attributed to it in the maritime district for twenty years has been 1,720, that of the first decade being 2,078, of the last decade 1,360; in the last four years 16 per cent. of the deaths at 70 and over were from old age. In the rest of the State 25 per cent. of the deaths over age 70 were attributed to old age. In 1903, with 22,000 deaths over age 70, 4,765, 21.7 per cent., were from old age; this year, with 24,700 deaths over age 70, 5,120, 20.7 per cent., were from old age. Of the deaths of the year,

90 per cent. were caused by disease;

6 per cent. were caused by accidents and violence;

4 per cent. were due to old age.

General diseases, as classified in the International Classification of Causes of Death, except epidemic diseases, consumption and cancer, are this year taken out of the unclassified group and given a separate specification. This group includes such general diseases as rheumatism, diabetes, syphilis, tuberculosis other than pulmonary, chronic poisoning and the like. There were 5,887 deaths from this class of diseases.

The urban death rate, which includes that of all cities over 20,000 in population, was 19.5 per thousand population; that of 1903 was 17.8. In the Maritime district it was 22.5; in the rest of the State 17.0.

The rural death rate, including the rest of the State, was 17.0; that of the Maritime district, which always is not very much less than the urban, was 20.0 per thousand population; of the rest of the State 15.5. The total death rate was 18.2.

In the tables which follow are given the details of deaths classified by causes and localities, and comparison with the years which precede this year of 1904.

The classification followed in the *Monthly Bulletin* is practically the same as that adopted for it in 1884 and for obvious reasons is adhered to for the sake of comparison of present with past data. It is, however, so far as classes go, in full accord with the International Classification of Causes of Death, which is followed by the United States Census Bureau.

SUMMARY OF MORTALITY OF THE STATE OF NEW YORK FOR THE YEAR 1904, AS PUBLISHED IN THE MONTHLY BULLETIN

TOTAL MORTALITY OF THE STATE BY MONTHS

1904	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under one year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years.)
January	12,288	18.7	1,750	1,139	2,447	43	124	9	3	161	95	36	22	318	193
February	12,749	20.7	1,782	1,174	2,421	48	145	9	1	149	94	54	37	305	207
March	14,303	21.7	2,116	1,123	2,828	105	163	10	1	152	168	73	50	252	182
April	13,700	21.5	2,031	1,419	2,379	254	104	7	......	173	225	54	49	330	241
May	12,243	18.6	1,754	952	2,128	409	103	19	2	145	193	52	51	286	247
June	10,997	17.2	1,770	1,127	1,668	242	78	14	2	90	130	24	33	250	544
July	12,061	18.5	3,534	2,833	1,615	140	124	10	1	52	71	21	32	207	2,479
August	11,116	17.0	2,974	1,139	1,567	119	143	16	2	27	34	18	40	171	2,011
September	10,293	16.1	2,398	891	1,625	85	179	17	......	33	24	20	31	178	1,267
October	9,906	15.0	1,747	730	1,735	75	201	13	1	56	25	11	26	203	576
November	10,185	16.0	1,407	709	2,094	75	147	12	......	63	46	21	27	241	205
December	11,463	17.5	1,646	941	2,235	113	136	13	......	93	65	46	28	300	177
Totals for the year	141,304	18.2	24,909	14,177	24,742	1,708	1,652	149	13	1,194	1,170	430	426	3,041	8,329
Average for five years past	125,991	17.2	....	*35,658	19,038	526	1,757	231	190	1,019	912	372	868	3,013	¶7,914
Totals for 1903	126,536	16.7	....	*32,768	22,050	454	1,665	137	41	1,057	721	354	811	3,035	¶7,480

*All deaths under five years. ¶Includes all ages.

TOTAL MORTALITY OF THE STATE BY MONTHS—(*Concluded*)

1904	OTHER CAUSES OF DEATH.												
	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases not epidemic (except consumption and cancer).	Unclassified.
January	1,187	1,510	1,097	106	644	991	1,334	1,319	459	540	463	470	1,164
February	1,179	1,821	1,002	143	606	1,014	1,350	1,239	442	570	542	542	1,250
March	1,432	2,011	1,072	144	757	1,040	1,453	1,449	492	619	600	572	1,446
April	1,399	1,765	1,126	140	663	1,016	1,400	1,290	432	639	493	547	1,353
May	1,297	1,172	839	116	643	985	1,264	1,420	487	708	425	518	857
June	1,136	505	502	96	562	818	1,003	1,095	410	1,695	331	470	962
July	1,146	302	376	144	677	841	969	1,117	460	783	349	446	1,314
August	1,075	286	344	78	732	759	963	922	513	738	306	493	1,326
September	991	560	183	70	739	748	971	999	493	683	344	421	1,257
October	1,069	800	275	77	611	766	1,115	991	507	658	384	431	1,035
November	1,104	1,220	353	74	597	905	1,155	1,043	540	609	404	479	865
December	1,144	1,579	432	84	635	932	1,327	1,258	462	580	419	498	1,142
Totals for the year	14,159	13,531	7,601	1,272	7,866	10,815	14,309	14,142	5,697	8,822	5,120	5,887	13,971
Average for five years past	13,406	....	†17,715	1,045	8,589	9,551	11,949	13,086	4,979	7,097	5,332	....	‡16,440
Totals for 1903	13,194	....	†17,339	1,110	7,282	9,998	13,561	12,966	5,456	7,646	4,765	....	‡17,464

†Includes all acute respiratory diseases. ‡Includes the preceding column.

TOTALS OF MORTALITY IN THE SANITARY DISTRICTS FOR THE YEAR.

1904	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under one year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years.)
*Districts:**															
Maritime	84,164	20.0	17,152	11,293	8,727	1,432	726	111	9	877	916	265	227	2,189	6,322
Hudson Valley	12,461	18.0	1,762	688	2,981	73	246	14	......	35	94	22	58	163	451
Adirondack and Northern	5,728	14.5	809	247	1,754	27	128	......	1	29	3	15	32	65	181
Mohawk Valley	6,846	16.0	1,014	375	1,915	41	85	......	......	78	16	15	36	108	268
Southern Tier	6,792	15.5	758	274	1,135	19	93	7	1	59	58	22	21	103	152
East Central	6,422	16.0	710	251	2,094	30	80	2	......	38	24	20	10	59	135
West Central	4,970	15.5	458	162	1,871	13	65	6	......	7	13	22	7	48	130
Lake Ontario and Western	13,921	15.5	2,274	897	3,268	73	229	9	2	71	46	49	35	306	740

*THE SANITARY DISTRICTS into which the State is divided are as follows: *Maritime District:* Includes New York, Brooklyn, Long Island, Staten Island and Westchester county. *Hudson Valley District:* All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern District:* The northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. *Mohawk Valley District:* Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties. *Southern Tier District:* The seven counties along the southern border of the State. *East Central District:* Sullivan, Delaware, Ostego, Madison, Chenango, Onondaga and Cortland counties *West Central District:* Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western District:* Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

TOTALS OF MORTALITY IN THE SANITARY DISTRICTS FOR THE YEAR—(*Concluded*).

1904.	Other Causes of Death.												
	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia.)	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years.)	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer.)	Unclassified.
*Districts:**													
Maritime	9,124	9,433	5,332	848	3,471	6,926	6,882	6,631	2,967	5,514	1,187	3,466	9,309
Hudson Valley	1,346	963	540	68	959	941	1,542	1,617	535	660	624	486	1,024
Adirondack and Northern	552	343	202	55	415	351	790	754	255	289	452	255	584
Mohawk Valley	579	505	251	58	550	467	817	878	314	433	481	278	588
Southern Tier	459	486	234	54	570	477	939	906	338	446	550	263	535
East Central	567	532	202	38	482	459	900	843	325	345	535	288	508
West Central	357	361	152	33	378	352	758	757	250	296	438	218	309
Lake Ontario and Western	1,175	908	688	118	1,041	842	1,681	1,756	713	839	853	633	1,114

*THE SANITARY DISTRICTS into which the State is divided are as follows: *Maritime District:* Includes New York, Brooklyn, Long Island, Staten Island and Westchester county. *Hudson Valley District:* All the counties on either side of the Hudson river except Westchester, to and including Albany and Rensselaer. *Adirondack and Northern District:* The northern section of the State—the counties of Washington, Warren, Hamilton, Essex, Clinton, Franklin, St. Lawrence, Jefferson and Lewis. *Mohawk Valley District:* Schenectady, Schoharie, Saratoga, Montgomery, Fulton, Herkimer and Oneida counties. *Southern Tier District:* The seven counties along the southern border of the State. *East Central District:* Sullivan, Delaware, Otsego, Madison, Chenango, Onondaga and Cortland counties. *West Central District:* Cayuga, Tompkins, Seneca, Schuyler, Ontario, Yates, Livingston, Genesee and Wyoming counties. *Lake Ontario and Western District:* Oswego, Wayne, Monroe, Orleans, Niagara and Erie counties.

RELATIVE AREA, DENSITY OF POPULATION AND DEATH RATES IN THE SANITARY DISTRICTS FOR THE YEAR, 1904.

DISTRICTS.	Area in square miles (land).	Population per square mile.	Urban death rate.*	Rural death rate.†	Total death rate.	Percentage of Deaths.			
						Under 1 year of age.	Between 1 and 5 years of age.	At 70 years of age and over.	From epidemic diseases.
Maritime	1,946	2,137	22.5	20.0	21.0	20.5	13.5	10.5	15.6
Hudson Valley	5,679	123	19.5	17.0	18.0	14.2	5.5	24.0	9.2
Adirondack and Northern	13,358	30	19.0	14.5	15.0	14.0	4.5	30.0	8.0
Mohawk Valley	5,179	81	18.5	15.5	16.0	15.0	5.5	28.0	9.5
Southern Tier	6,419	67	17.0	15.5	15.7	11.0	4.0	31.5	8.0
East Central	6,252	65	16.0	15.5	15.7	11.0	4.0	33.0	6.0
West Central	4,588	70	14.2	15.8	15.5	9.0	3.0	37.0	6.0
Lake Ontario and Western	4,199	217	16.0	15.0	15.2	16.0	6.5	23.0	11.0
Entire State	47,620	162	19.5	17.0	18.2	17.5	10.0	17.5	12.8

* Namely in cities of 20,000 population and over. † In towns and smaller cities and villages of less than 20,000 population.

RELATIVE AREA, DENSITY OF POPULATION AND DEATH RATES IN THE SANITARY DISTRICTS FOR THE YEAR, 1904.—(*Concluded*).

DISTRICTS.	In Each 1,000 Deaths from all Causes there were from—						
	Typhoid fever.	Scarlet fever.	Diphtheria and croup.	Diarrheal diseases.	Consumption.	Pneumonia.	Bright's disease.
Maritime	9	11	26	76	110	110	65
Hudson Valley	20	3	13	36	108	78	62
Adirondack and Northern	22	5	11	23	96	60	50
Mohawk Valley	13	11	15	40	85	73	55
Southern Tier	11	9	15	23	69	70	53
East Central	12	6	9	20	87	83	56
West Central	13	1	10	26	71	72	55
Lake Ontario and Western	17	2	22	53	85	65	50
Entire State	12	8	21	60	100	95	62

MORTALITY OF THE MONTHS

MONTHS.	Total number of deaths.	Deaths under five years.	Percentage of deaths under five years to total deaths.	Epidemic deaths per 1,000 deaths from all causes.	Cerebrospinal fever.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
January:												
1890..........	13,020	2,207	18.2	89	29	117	62	.....	93	42	30	114
1891..........	9,549	2,868	30.0	132	47	138	44	1	182	140	30	92
1892..........	13,460	3,266	24.1	107	58	116	38	2	294	80	51	48
1893..........	10,490	3,056	29.1	137	44	120	34	15	237	86	52	94
1894..........	10,948	3,088	28.2	124	53	105	30	34	146	122	45	55
1895..........	10,980	3,123	28.6	100	51	108	30	3	103	34	38	78
1896..........	10,176	3,064	30.0	129	49	158	22	1	118	199	31	73
1897..........	9,587	2,663	27.7	104	42	108	26	.....	76	70	28	58
1898..........	9,632	2,416	25.0	95	34	122	26	.....	123	112	21	44
1899..........	12,421	2,590	21.0	65	52	111	12	1	71	51	43	77
1900..........	10,552	2,788	26.5	94	29	144	17	.....	75	154	43	79
1901..........	12,524	2,557	20.5	84	38	192	14	10	108	59	33	56
1902..........	10,968	2,933	26.8	103	48	146	16	39	141	132	42	58
1903..........	11,146	2,625	23.5	85	39	152	8	20	98	40	27	73
1904..........	12,288	2,889	23.5	90	43	124	9	3	161	95	36	22
February:												
1890..........	9,130	2,370	27.5	118	37	94	39	.....	96	50	32	92
1891..........	8,704	2,813	32.5	141	41	127	32	.....	203	127	58	81
1892..........	10,755	3,139	29.2	123	53	98	33	7	290	89	79	41
1893..........	9,353	2,810	29.6	136	46	101	29	23	198	80	58	121
1894..........	9,417	2,943	30.2	125	42	86	14	52	139	125	41	60
1895..........	10,771	3,049	28.3	85	40	99	9	5	98	44	38	87
1896..........	9,825	2,892	29.5	116	31	121	28	.....	110	192	45	52
1897..........	9,826	2,743	28.0	97	52	98	23	.....	84	89	26	75
1898..........	9,213	2,543	27.5	91	53	104	22	.....	93	84	32	47
1899..........	10,763	2,506	23.5	70	45	116	20	1	87	37	36	76
1900..........	10,796	3,142	29.1	107	49	122	18	.....	119	206	56	91
1901..........	11,022	2,482	22.6	86	41	114	11	35	126	74	54	54
1902..........	10,670	2,890	27.0	102	47	63	14	51	162	166	34	72
1903..........	10,826	2,604	23.1	82	29	151	8	3	114	55	37	74
1904..........	12,749	2,956	23.2	82	48	145	9	1	149	94	54	37
March:												
1890..........	9,844	2,772	30.0	117	47	72	36	2	90	94	47	110
1891..........	10,672	3,108	29.2	115	63	121	42	.....	195	157	40	104
1892..........	10,978	2,342	21.3	124	77	96	37	3	285	114	70	48
1893..........	12,000	3,418	28.5	120	89	115	37	29	221	76	41	166
1894..........	10,196	3,215	31.5	137	52	131	26	47	174	164	46	95
1895..........	11,379	3,340	29.4	98	53	99	23	.....	131	99	51	83
1896..........	11,080	3,255	29.6	103	54	103	20	1	76	251	47	77
1897..........	11,574	3,381	29.2	92	55	83	26	2	99	113	45	121
1898..........	10,300	2,860	28.0	96	73	119	23	.....	108	144	24	89
1899..........	11,065	2,807	25.2	75	82	121	12	1	98	61	40	73
1900..........	13,033	3,574	27.4	93	50	120	23	.....	94	202	86	129
1901..........	11,913	3,070	25.8	94	61	111	6	39	200	100	50	57
1902..........	10,935	2,936	27.0	98	44	112	16	51	134	138	33	69
1903..........	11,651	2,891	25.7	62	42	151	10	2	100	70	48	109
1904..........	14,303	3,239	22.7	80	105	163	10	1	152	168	73	50
April:												
1890..........	9,488	2,826	31.8	121	51	73	43	1	78	187	43	77
1891..........	13,981	2,809	27.3	92	67	103	48	1	273	150	42	106
1892..........	10,590	3,245	30.7	128	76	77	40	11	248	161	63	60
1893..........	11,865	3,339	28.1	111	104	111	34	23	199	73	55	133
1894..........	9,945	3,147	31.5	135	55	94	33	54	184	148	49	104
1895..........	10,545	3,506	33.3	115	78	115	32	.....	118	133	62	107
1896..........	10,480	3,246	31.0	111	50	87	33	.....	81	234	62	88
1897..........	10,325	2,813	27.3	95	55	79	27	7	81	99	44	90
1898..........	10,000	2,763	28.0	93	82	80	28	.....	84	126	29	118
1899..........	10,383	2,627	25.4	77	90	101	20	2	78	68	40	65
1900..........	12,486	3,376	27.1	86	61	96	23	1	92	191	94	117
1901..........	10,035	2,892	26.2	107	59	120	16	42	219	109	62	78
1902..........	10,772	2,444	22.5	100	42	103	12	61	142	122	44	85
1903..........	10,95[illegible]	2,685	24.5	84	49	105	10	6	131	66	46	86
1904..........	13,[illegible]00	3,4[illegible]0	25.2	105	254	104	7	.....	173	225	54	49

FOR FIFTEEN YEARS.

Croup and diphtheria.	Diarrheal diseases.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrheal).	Diseases of urinary system.	Disease of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
534	98	3,847	1,801	95	542	553	724	1,107	277	333	653	1,969
489	103	1,761	1,210	81	533	548	737	1,041	220	288	523	1,251
659	94	3,801	1,286	125	686	541	953	1,339	295	362	1,183	1,149
613	141	2,293	1,099	136	568	607	866	1,128	260	339	515	1,243
680	87	2,479	1,140	103	618	664	812	1,164	258	361	707	1,285
547	108	2,578	1,244	81	617	622	916	1,037	290	403	506	1,586
530	127	2,015	1,152	91	614	688	934	959	302	344	464	1,305
476	112	1,742	1,051	83	592	658	964	1,005	322	437	503	1,234
323	113	1,765	1,051	91	642	739	1,013	1,032	346	400	467	1,168
255	127	2,965	1,304	76	735	818	1,116	1,386	351	400	917	1,553
352	95	2,100	1,140	121	686	838	968	1,138	382	461	460	1,270
345	196	2,770	1,326	98	629	877	1,114	1,223	440	544	648	1,804
320	188	2,274	1,038	99	645	853	1,234	1,103	384	500	448	1,260
288	211	1,991	1,205	90	547	976	1,256	1,159	467	568	490	1,441
318	193	2,607	1,187	106	644	991	1,334	1,319	459	540	463	1,634
518	82	1,950	1,304	74	477	415	556	927	209	264	515	1,399
419	121	1,683	958	107	517	522	672	1,003	205	290	504	1,007
538	99	2,315	1,196	113	620	564	813	1,218	232	340	770	1,247
480	141	1,910	954	102	602	554	779	1,102	218	279	496	1,080
527	89	1,940	1,063	87	578	550	728	1,112	227	283	499	1,175
391	107	2,526	1,161	93	600	670	917	1,035	281	351	598	1,621
444	114	2,012	1,084	100	577	690	879	992	303	398	502	1,151
370	134	1,996	1,117	72	614	628	956	1,071	251	403	490	1,176
275	119	1,738	1,031	75	673	754	763	1,123	309	337	483	1,098
236	101	2,329	1,204	64	651	765	1,045	1,200	320	412	710	1,308
352	137	2,402	1,131	107	543	873	866	1,109	396	471	463	1,285
240	200	2,292	1,130	114	614	832	1,095	1,135	371	403	603	1,486
264	180	2,241	1,100	97	558	823	1,189	1,161	375	457	412	1,174
240	181	2,071	1,160	89	566	829	1,174	1,124	422	517	459	1,523
305	207	2,823	1,179	143	606	1,014	1,350	1,239	442	570	542	1,792
514	94	1,929	1,238	99	511	471	709	1,051	235	314	520	1,661
413	101	2,307	1,318	112	613	611	771	1,165	283	290	696	1,270
531	108	2,390	1,272	137	638	583	803	1,305	276	323	690	1,192
517	163	2,951	1,286	131	699	695	885	1,330	303	334	589	1,343
546	124	1,814	1,190	110	638	633	760	1,196	262	346	476	1,366
445	137	2,395	1,274	104	691	721	971	1,160	312	417	714	1,499
370	142	2,310	1,490	121	695	744	1,031	1,180	316	414	586	1,052
377	146	2,485	1,190	117	672	737	1,136	1,208	375	441	615	1,531
281	123	1,872	1,166	89	718	810	901	1,251	382	430	511	1,186
220	126	2,145	1,284	81	726	838	1,052	1,290	418	419	588	1,390
342	167	3,137	1,363	160	689	982	1,132	1,301	443	437	591	1,585
277	215	2,522	1,293	122	644	884	1,116	1,324	409	409	532	1,542
247	227	1,951	1,235	120	606	911	1,167	1,176	406	487	442	1,363
251	222	2,107	1,260	117	644	915	1,307	1,157	478	537	534	1,590
252	182	3,083	1,432	144	757	1,040	1,453	1,449	492	619	660	2,018
436	97	1,781	1,138	75	599	484	691	1,046	220	330	460	1,578
370	122	4,357	1,377	92	596	645	869	1,348	271	418	901	1,816
491	131	2,161	1,252	126	665	576	822	1,291	240	400	466	1,233
444	143	2,943	1,329	124	678	637	865	1,413	304	402	572	1,279
511	117	1,718	1,091	85	688	604	741	1,102	298	449	501	1,319
424	151	2,135	1,220	83	666	653	917	1,017	282	433	494	1,425
345	187	2,124	1,189	98	635	641	919	1,080	320	480	471	1,356
360	137	1,893	1,158	105	646	742	979	1,167	325	455	517	1,359
252	137	1,869	1,100	91	671	782	884	1,218	333	435	481	1,200
197	138	1,895	1,187	93	760	820	997	1,206	346	430	532	1,318
277	117	2,962	1,302	125	852	860	1,080	1,270	410	469	578	1,509
273	200	1,899	1,296	101	613	867	1,058	1,268	423	481	447	1,404
268	231	1,716	1,154	108	644	872	1,188	1,241	439	515	414	1,371
247	224	1,808	1,224	112	596	851	1,279	1,178	453	606	434	1,440
330	241	2,891	1,399	140	663	1,016	1,400	1,290	432	639	493	1,890

MORTALITY OF THE MONTHS

MONTHS.	Total number of deaths.	Deaths under five years.	Percentage of deaths under five years to total deaths.	Epidemic deaths per 1,000 deaths from all causes.	Cerebrospinal fever.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.
May:												
1890	9,194	2,740	31.6	130	62	72	55	.....	60	200	34	68
1891	10,213	2,917	28.6	117	57	88	35	.....	252	184	37	79
1892	10,223	3,289	32.3	139	69	71	50	13	245	254	56	69
1893	10,718	3,080	28.7	128	159	93	40	21	193	92	43	127
1894	9,286	2,862	30.8	139	53	85	29	37	140	97	36	97
1895	9,452	2,888	30.5	116	46	92	38	1	83	183	36	77
1896	9,541	2,842	30.0	119	51	59	38	1	78	172	40	100
1897	9,266	2,469	27.0	103	51	65	44	7	98	119	35	62
1898	9,748	2,640	27.0	93	81	86	27	.....	113	109	30	112
1899	9,556	2,366	25.0	78	71	93	14	5	76	85	45	37
1900	10,938	3,160	29.0	93	51	102	28	1	71	161	52	111
1901	10,327	2,620	25.4	112	43	96	15	67	226	95	44	69
1902	10,616	2,778	26.2	105	46	99	20	52	175	104	32	83
1903	10,770	2,523	23.5	100	58	99	25	3	127	108	46	85
1904	1,243	2,706	22.0	125	409	108	19	2	143	193	52	51
June:												
1890	9,185	3,515	40.2	217	28	69	63	1	68	161	29	90
1891	9,321	3,615	38.8	186	42	80	46	.....	207	133	41	65
1892	9,075	3,437	37.7	188	57	75	62	10	183	255	37	50
1893	8,728	2,885	33.0	162	96	83	42	10	154	99	24	77
1894	9,805	3,588	36.6	182	32	72	43	24	121	90	15	79
1895	8,736	3,114	35.6	175	40	81	35	.....	71	217	28	95
1896	9,342	3,466	37.0	183	44	66	37	.....	50	140	22	85
1897	9,028	2,865	31.5	140	51	66	31	7	82	86	31	64
1898	8,637	2,558	30.0	122	109	70	22	.....	82	99	17	111
1899	9,433	3,104	33.0	145	62	80	22	7	71	102	31	73
1900	9,444	3,101	33.0	120	39	65	26	1	44	120	40	71
1901	9,500	2,500	26.3	133	42	83	27	74	165	95	27	54
1902	9,449	2,790	29.5	150	36	99	16	70	111	100	28	86
1903	9,285	2,453	26.5	135	36	74	11	2	102	104	30	71
1904	10,997	2,897	26.3	128	242	78	14	2	90	130	24	33
July:												
1890	11,606	5,602	50.5	327	56	101	56	.....	45	91	12	133
1891	11,370	5,782	50.8	329	57	97	44	.....	181	93	19	48
1892	13,555	6,855	52.1	340	59	131	61	8	75	150	20	136
1893	12,332	6,231	50.5	324	86	87	45	16	69	75	13	92
1894	12,516	6,260	50.0	335	50	93	44	19	76	55	14	121
1895	11,681	5,841	50.0	326	49	108	26	.....	32	130	20	143
1896	12,659	6,192	49.0	305	64	103	50	.....	55	85	12	117
1897	11,235	5,089	45.5	272	54	87	36	4	69	76	16	66
1898	11,441	4,945	43.0	255	68	89	24	.....	59	52	13	176
1899	11,291	4,819	42.6	239	56	94	34	1	45	82	21	101
1900	11,641	4,728	40.6	235	53	101	17	1	43	92	22	113
1901	12,248	4,344	35.5	236	51	99	24	89	105	.78	17	71
1902	10,938	4,132	38.5	250	54	107	21	34	76	57	23	115
1903	11,134	3,872	34.8	223	31	126	10	.....	89	88	14	72
1904	12,061	6,367	53.0	260	140	124	10	1	52	71	21	32
August:												
1890	10,642	4,480	48.8	292	49	167	86	.....	35	69	11	153
1891	10,720	4,829	45.0	297	38	171	67	.....	120	41	14	64
1892	10,903	4,933	45.2	292	54	182	56	18	61	51	19	138
1893	11,037	4,954	45.0	298	55	157	62	11	63	44	14	129
1894	10,390	4,664	44.8	283	44	183	41	6	48	19	17	129
1895	11,050	4,962	45.0	282	46	156	39	.....	26	76	17	156
1896	12,475	4,789	38.4	246	43	171	48	.....	19	59	20	132
1897	10,084	4,021	40.0	240	38	124	41	.....	19	40	23	84
1898	11,302	4,811	42.5	255	40	181	49	.....	26	26	16	168
1899	10,003	3,696	37.0	216	64	157	23	.....	26	49	15	120
1900	11,047	4,223	38.3	237	47	174	37	2	22	49	11	86
1901	10,999	4,339	40.0	285	43	168	36	40	49	40	9	80
1902	10,632	4,024	38.0	250	40	165	21	10	39	28	14	110
1903	10,435	3,654	35.0	220	46	141	7	.....	50	49	20	82
1904	11,116	4,113	37.0	230	119	143	16	2	27	34	18	40

FOR FIFTEEN YEARS—(*Continued*).

Croup and diphtheria.	Diarrheal diseases.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrheal).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	Unclassified.
420	142	1,538	1,077	95	539	508	691	999	273	371	436	1,554
339	127	2,129	1,234	114	561	555	741	1,021	248	434	629	1,349
480	113	1,972	1,207	108	617	611	776	1,159	270	461	443	1,180
439	175	1,944	1,239	86	660	664	834	1,287	286	544	508	1,284
585	136	1,333	1,093	93	644	577	745	1,056	265	487	427	1,271
390	157	1,459	1,149	83	628	669	903	1,022	270	503	413	1,250
292	205	1,474	1,193	93	647	644	852	1,066	326	555	400	1,155
368	113	1,357	1,054	80	637	716	935	1,001	386	478	449	1,211
223	127	1,576	1,127	84	695	757	915	1,171	375	478	469	1,193
203	122	1,389	1,169	92	716	763	912	1,117	359	555	484	1,249
290	157	1,899	1,284	96	786	797	983	1,200	392	581	492	1,405
263	236	1,406	1,224	92	649	769	1,114	1,195	434	590	415	1,285
243	259	1,673	1,135	86	586	885	1,179	1,098	501	633	388	1,139
275	249	1,722	1,139	107	590	874	1,228	1,185	429	685	360	1,376
286	247	2,011	1,297	116	643	985	1,264	1,420	487	708	425	1,375
364	1,087	972	984	83	679	497	541	1,000	237	452	347	1,433
319	808	1,098	978	103	720	479	678	1,127	224	534	353	1,286
309	676	1,060	1,005	89	692	449	693	1,132	248	545	368	1,080
359	478	1,010	1,065	67	612	503	679	1,108	241	564	384	1,073
575	739	1,037	982	84	723	583	718	1,180	307	628	419	1,354
338	627	825	974	63	665	592	718	927	275	620	357	1,188
362	915	877	1,097	69	793	625	782	947	290	551	385	1,205
354	503	945	1,002	83	784	643	864	1,037	325	530	362	1,178
174	372	857	1,007	96	783	656	780	1,031	367	581	361	1,062
236	686	883	1,028	76	869	709	746	1,087	408	661	409	1,192
243	477	1,058	1,070	90	874	705	807	1,057	397	637	358	1,265
246	450	965	1,111	97	596	751	957	981	418	723	379	1,259
228	636	944	980	74	570	758	1,041	949	411	646	338	1,328
264	560	894	978	88	576	757	970	924	450	594	320	1,480
250	544	1,007	1,136	96	562	818	1,008	1,095	410	1,695	331	1,432
293	2,916	706	1,073	60	1,024	497	543	1,092	242	553	395	1,718
304	2,906	717	1,032	67	1,036	502	652	1,158	239	458	363	1,397
340	3,629	861	1,093	96	1,264	556	700	1,348	266	842	417	1,503
379	3,206	746	1,073	72	1,219	552	726	1,252	300	598	383	1,333
470	3,258	688	1,094	64	1,184	527	638	1,282	296	683	392	1,468
323	2,974	627	1,040	83	1,135	599	732	1,000	322	549	364	1,425
293	3,086	785	1,050	72	1,267	661	842	1,169	349	649	409	1,541
258	2,396	693	941	92	1,114	569	804	1,090	323	750	416	1,381
159	2,298	710	1,116	67	1,244	646	793	1,118	380	762	388	1,279
193	2,068	748	1,076	70	1,428	755	690	981	396	645	402	1,405
208	2,082	726	1,102	75	1,446	727	798	1,016	431	857	377	1,354
125	2,231	602	1,062	78	609	776	821	1,175	434	2,020	409	1,372
180	2,038	752	1,038	86	632	741	953	1,000	434	745	375	1,467
234	1,815	846	991	94	627	808	1,052	1,054	463	900	371	1,449
207	2,479	678	1,146	144	677	841	969	1,117	460	783	349	1,760
233	2,192	666	1,064	70	871	442	537	1,125	236	512	375	1,749
266	2,405	675	1,041	87	925	480	612	1,133	257	617	477	1,235
275	2,328	704	1,056	73	985	512	662	1,208	279	572	369	1,301
328	2,406	663	1,040	73	986	534	676	1,167	283	600	432	1,314
383	2,068	621	1,031	71	945	573	626	1,011	395	543	405	1,331
305	2,303	668	1,051	67	1,027	523	741	1,034	357	597	457	1,404
257	2,326	636	1,059	69	1,062	644	802	1,113	294	1,695	508	1,518
249	1,799	597	1,027	92	1,023	617	803	879	387	600	387	1,265
124	2,345	613	1,019	67	1,288	651	749	1,062	390	709	430	1,349
171	1,535	599	1,034	75	1,091	679	736	955	394	576	433	1,271
198	1,985	577	1,047	84	1,244	681	773	995	436	777	379	1,443
142	2,555	509	1,078	81	693	629	831	993	411	683	361	1,568
161	2,089	664	984	80	608	728	865	994	443	733	365	1,491
157	1,750	543	1,025	82	737	709	976	959	470	683	325	1,624
171	2,011	630	1,075	78	732	759	963	922	513	738	306	1,819

MORTALITY OF THE MONTHS

MONTHS.	Total number of deaths.	Deaths under five years.	Percentage of deaths under five years to total deaths.	Epidemic deaths per 1000 deaths from all causes.	Cerebrospinal fever.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles	Erysipelas.	Whooping cough.
September:												
1890	9,111	3,356	39.0	224	30	234	84	....	40	29	15	102
1891	9,662	3,984	41.2	247	59	287	83	....	99	21	13	60
1892	9,695	3,760	38.8	235	48	282	74	9	78	37	16	94
1893	9,346	3,718	39.8	248	49	227	63	23	34	24	11	85
1894	9,525	3,948	41.5	244	28	229	51	9	33	15	11	102
1895	10,011	4,161	41.5	250	52	220	50	....	26	36	15	119
1896	9,467	3,396	36.0	197	44	221	65	....	26	31	11	102
1897	9,588	3,432	35.5	188	51	157	34	....	31	19	12	76
1898	11,481	4,320	37.5	230	47	333	82	....	26	20	6	120
1899	9,186	3,068	33.4	172	57	205	21	....	19	34	6	85
1900	10,251	3,760	36.7	220	41	245	41	....	12	21	16	66
1901	10,269	3,668	35.7	283	25	210	47	11	32	14	14	60
1902	9,682	3,218	32.6	195	30	179	20	6	31	7	15	83
1903	9,468	2,838	30.0	171	29	170	18	....	34	16	12	51
1904	10,293	3,289	31.9	170	85	179	17	....	33	24	20	31
October:												
1890	8,640	2,665	32.7	155	26	240	87	....	62	47	6	84
1891	9,718	3,454	35.5	200	47	290	70	....	118	36	14	54
1892	9,092	2,894	31.8	174	35	205	72	27	96	26	18	78
1893	8,981	2,994	33.4	185	56	253	50	19	65	14	16	56
1894	9,008	2,936	32.5	180	22	234	46	5	32	15	6	72
1895	9,320	2,951	31.5	167	36	265	50	2	36	46	13	95
1896	8,676	2,451	28.2	130	27	195	57	....	35	37	12	67
1897	9,080	2,055	22.6	135	30	173	44	....	49	33	15	59
1898	9,632	2,868	30.0	140	37	281	49	....	38	10	14	59
1899	9,280	3,175	34.2	110	46	202	27	1	36	24	17	60
1900	9,676	3,864	29.6	146	36	283	37	....	24	24	13	54
1901	9,738	2,627	27.0	150	25	235	40	14	38	20	17	53
1902	9,475	2,537	27.0	132	34	225	18	4	56	17	6	61
1903	9,786	2,458	25.0	123	31	194	12	....	45	27	13	31
1904	9,906	2,477	25.0	120	75	201	13	1	56	25	11	26
November:												
1890	8,209	2,199	28.5	146	29	216	68	....	102	74	17	62
1891	8,727	2,528	29.0	151	39	241	61	2	179	31	26	31
1892	8,448	2,540	30.1	167	39	184	50	18	127	51	26	77
1893	8,458	2,324	27.5	157	45	180	30	27	77	56	14	50
1894	8,159	2,254	27.6	151	25	189	30	10	52	15	17	53
1895	8,372	2,287	27.4	134	24	204	43	....	51	96	18	57
1896	7,888	2,165	37.5	113	25	132	21	....	48	45	18	44
1897	8,325	2,045	24.5	108	31	151	28	....	62	63	12	27
1898	8,709	1,970	22.7	90	36	189	30	1	32	18	17	52
1899	8,607	2,187	25.4	101	38	169	25	....	54	75	26	47
1900	8,715	2,178	25.0	110	38	233	26	1	33	32	12	50
1901	9,309	2 097	22.6	110	26	147	23	9	81	49	6	39
1902	9,010	2,086	23.2	100	15	208	10	20	63	19	10	44
1903	10,009	2,157	21.7	100	23	165	9	3	64	48	17	37
1904	10,185	2,116	20.8	80	75	147	12	....	63	46	21	27
December:												
1890	8,761	2,635	30.0	135	30	157	59	....	144	117	36	71
1891	11,241	3,023	26.9	133	32	183	47	....	246	78	33	41
1892	9,528	2,754	28.9	146	24	147	40	17	195	82	22	82
1893	10,600	2,834	26.7	117	46	158	27	35	106	70	25	73
1894	9,000	2,567	28.5	133	33	139	35	11	82	35	34	53
1895	9,438	2,772	29.5	134	31	169	34	....	75	172	34	72
1896	9,074	2,378	26.0	112	28	126	30	....	63	50	20	59
1897	9,180	2,195	25.0	97	28	160	20	....	91	61	26	43
1898	10,877	2,269	21.0	70	35	156	22	....	53	38	18	59
1899	9,833	2,441	25.0	93	39	155	18	2	69	88	33	72
1900	9,889	2,310	23.3	105	37	263	16	7	60	81	21	53
1901	10,373	2,579	24.8	104	38	166	24	15	81	126	30	52
1902	10,347	2,447	23.6	97	20	182	5	44	85	39	33	57
1903	11,075	2,009	18.2	90	41	137	9	2	103	50	44	40
1904	11,463	2,587	22.5	85	113	136	13	....	93	65	46	28

FOR FIFTEEN YEARS—(*Concluded*).

Croup and diphtheria.	Diarrheal diseases.	Acute respiratory diseases.	Consumption.	Puerperal diseases.	Diseases of digestive system (not diarrheal).	Diseases of urinary system	Diseases of circulatory system.	Diseases of nervous system.	Cancer	Accidents and violence.	Old age.	Unclassified.
247	1,196	710	1,027	47	768	418	520	871	236	375	450	1,712
334	1,434	720	1,039	65	924	479	596	997	289	449	421	1,293
374	1,266	854	1,023	69	887	502	644	1,008	280	469	461	1,208
411	1,395	713	912	68	863	528	597	1,026	268	443	391	1,221
389	1,454	668	988	54	852	492	612	970	268	488	399	1,413
322	1,672	675	1,009	65	923	577	703	988	277	522	452	1,308
294	1,077	826	1,023	57	848	556	810	905	306	543	417	1,305
259	1,171	785	998	70	949	602	825	933	327	651	421	1,217
135	1,872	768	1,076	70	1,162	647	856	1,116	378	927	478	1,362
183	972	755	947	50	1,065	646	729	937	366	537	327	1,245
154	1,656	645	980	72	1,143	727	705	905	405	605	420	1,392
183	1,808	582	1,021	58	673	705	815	958	417	577	402	1,657
166	1,390	835	917	80	622	686	899	995	314	589	512	1,306
186	1,103	765	946	69	634	710	907	944	475	681	322	1,396
178	1,267	743	991	70	739	748	971	999	493	683	344	1,678
382	360	1,001	1,061	71	635	485	597	884	238	366	470	1,538
527	794	1,012	1,124	60	832	558	695	1,023	259	430	494	1,281
551	491	1,132	996	62	709	547	694	1,024	263	448	420	1,198
599	533	947	1,070	58	771	542	658	1,010	273	422	363	1,206
551	635	901	1,013	54	757	540	690	959	298	452	477	1,249
458	554	749	1,112	67	761	630	767	840	319	511	445	1,564
361	338	1,123	990	70	689	605	908	815	323	455	437	1,132
370	444	1,090	1,070	79	717	608	820	911	358	568	437	1,205
180	687	1,044	1,052	65	943	673	848	1,015	376	526	443	1,292
254	361	1,163	1,064	57	832	753	810	1,017	394	550	417	1,195
228	712	967	1,078	62	955	760	830	934	376	540	429	1,334
260	733	916	1,112	59	659	792	923	991	424	527	425	1,475
215	613	985	1,027	61	610	777	1,040	1,039	416	571	406	1,294
256	598	968	1,038	87	617	791	1,038	1,044	456	668	369	1,503
203	576	1,075	1,069	77	611	766	1,115	991	507	658	384	1,456
467	124	1,207	1,019	74	518	435	554	851	208	387	409	1,388
567	143	1,507	1,017	65	583	501	656	967	237	404	437	1,033
697	137	1,445	940	55	582	490	674	845	244	377	382	1,008
700	152	1,242	957	57	595	429	691	925	242	411	469	1,009
703	146	1,131	1,022	48	567	575	662	883	262	383	394	991
483	150	1,348	979	71	583	584	750	798	263	473	370	1,027
429	132	1,184	876	66	524	599	828	772	330	443	355	1,017
339	191	1,153	977	78	605	667	867	841	308	432	418	1,075
242	165	1,288	1,049	54	625	681	918	998	380	456	451	1,027
307	132	1,274	1,027	61	642	729	832	916	370	457	412	1,014
304	231	1,172	1,011	66	694	758	764	955	390	412	401	1,132
331	300	1,203	1,063	74	537	841	1,002	1,000	410	478	364	1,326
248	254	1,327	951	61	541	689	997	1,043	419	625	374	1,092
323	288	1,573	1,076	91	566	864	1,124	1,056	415	612	381	1,274
241	205	1,573	1,104	74	597	905	1,155	1,043	540	609	404	1,344
497	80	1,756	1,045	85	533	488	643	1,000	257	285	454	1,029
725	115	2,731	1,090	100	646	593	801	1,183	296	416	732	1,153
673	113	1,737	1,145	78	575	572	779	1,132	259	404	416	1,036
678	123	2,445	1,099	80	581	610	792	1,078	254	359	724	1,237
672	103	1,555	1,117	58	551	628	719	1,033	269	384	401	1,088
563	115	1,740	1,054	79	596	609	931	866	306	510	399	1,083
520	127	1,454	1,062	66	604	673	899	927	330	495	443	1,098
335	122	1,540	1,056	61	610	679	952	981	344	427	501	1,118
244	141	2,250	1,185	71	657	845	1,091	1,177	369	479	562	1,425
331	112	1,793	1,088	82	648	789	941	1,085	416	451	437	1,184
358	143	1,587	1,082	78	733	793	970	1,113	413	467	454	1,160
341	213	1,923	1,050	94	562	835	1,103	1,123	442	491	454	1,210
319	210	1,624	1,023	82	613	881	1,137	1,165	458	557	465	1,348
314	279	2,051	1,152	84	582	914	1,250	1,182	478	595	400	1,368
300	177	2,011	1,144	84	635	932	1,327	1,258	462	580	419	1,640

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—MARITIME DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	55,021	......	22,436	......	233	488	718	28	989	948	230	694	3,207	5,828
1886	57,420	......	24,668	......	246	483	687	37	790	790	223	880	4,103	5,243
1887	61,715	......	25,289	......	232	528	658	171	933	988	217	283	4,654	6,501
1888	64,421	......	27,513	......	201	558	519	153	2,012	670	240	820	4,378	5,900
1889	65,037	......	27,691	......	243	638	468	...	1,661	700	209	993	4,098	5,596
1890	67,512	......	26,781	......	170	625	444	2	562	972	216	681	3,314	5,576
1891	74,681	......	30,620	......	311	658	381	1	1,858	940	243	678	3,466	6,146
1892	74,590	......	30,905	......	364	634	412	142	1,499	1,093	278	640	3,573	6,422
1893	75,027	......	29,561	......	652	657	337	252	939	538	227	905	3,837	5,998
1894	71,055	......	29,826	......	254	561	300	281	784	829	206	594	5,066	5,647
1895	74,246	21.2	30,303	......	335	566	281	11	626	1,023	238	853	3,830	5,992
1896	75,789	21.5	29,122	......	291	594	333	3	566	1,106	200	722	3,403	5,413
1897	67,646	18.9	25,804	......	332	535	285	27	726	621	192	508	2,881	4,744
1898	71,196	20.0	26,908	......	401	724	296	1	727	529	150	801	1,786	5,285
1899	70,384	18.4	25,751	......	414	578	185	18	550	600	241	565	2,008	3,905
1900	75,989	19.5	27,625	......	310	760	240	11	479	863	325	616	2,393	4,292
1901	76,030	20.0	25,649	7,818	257	775	222	426	1,178	469	208	334	2,147	7,114
1902	73,325	18.6	25,494	7,310	264	809	138	322	968	737	193	661	2,111	6,187
1903	73,011	18.0	22,926	7,531	271	697	100	7	758	520	205	376	2,262	5,465
1904	84,164	20.0	28,445	8,727	1,432	726	111	9	877	916	265	227	2,189	6,322

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—MARITIME DISTRICT—(*Concluded*).

YEAR.	OTHER CAUSES OF DEATH.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	7,896	8,036	648	2,813	3,095	2,863	5,252	1,087	1,989	2,909	5,056
1886	8,069	8,269	557	3,034	3,241	2,941	5,329	1,171	2,094	3,076	6,138
1887	7,546	8,517	560	3,457	3,480	3,197	6,102	1,317	2,289	3,437	6,652
1888	7,996	9,654	650	3,643	3,589	3,486	6,729	1,349	2,126	2,177	7,646
1889	8,014	9,619	599	3,866	491	3,653	6,665	1,358	2,157	1,491	8,897
1890	8,621	7,504	586	4,379	3,886	3,872	6,691	1,543	2,507	1,518	10,468
1891	8,373	13,638	666	4,737	4,334	4,368	7,123	1,522	2,900	1,569	10,791
1892	8,250	12,771	716	5,105	4,260	4,469	7,463	1,609	3,225	1,620	10,043
1893	8,359	13,472	600	5,099	4,583	4,609	7,558	1,614	3,030	1,543	10,218
1894	7,796	10,414	521	5,266	4,416	4,189	6,851	1,655	3,282	1,442	10,701
1895	8,319	11,683	513	5,463	4,755	5,413	5,580	1,805	3,784	1,371	11,764
1896	8,314	11,328	591	5,374	4,920	5,586	5,570	1,894	4,684	1,459	10,522
1897	7,204	9,768	536	5,221	4,938	5,455	5,435	2,031	3,672	1,322	10,813
1898	8,191	10,677	533	6,314	5,368	5,020	6,370	2,174	3,901	1,417	10,298
1899	8,546	11,264	529	6,309	5,813	4,788	6,255	2,302	3,639	1,594	10,281
1900	8,650	13,240	744	6,804	6,115	4,931	6,049	2,449	4,150	1,456	11,112
1901	8,730	11,010	656	3,270	6,171	5,888	6,241	2,651	4,996	1,455	11,832
1902	8,080	11,798	662	3,242	6,141	6,438	5,970	2,557	4,074	1,307	10,666
1903	8,582	11,620	688	3,113	6,255	6,445	5,775	2,828	4,405	1,025	11,614
1904	9,124	14,665	848	3,471	6,926	6,882	6,631	2,967	5,514	1,187	12,775

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—HUDSON VALLEY DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea
1885	8,941	......	2,688	......	86	249	95	3	63	109	25	48	580	560
1886	9,639	......	2,991	......	145	263	64	1	70	70	32	141	597	612
1887	9,895	......	2,864	......	135	270	79	4	109	49	25	41	579	706
1888	11,015	......	3,248	......	93	355	80	7	231	48	23	85	708	740
1889	11,106	......	3,222	......	58	257	96	......	324	108	18	68	722	681
1890	10,893	......	2,713	......	67	222	87	1	48	6	26	159	363	443
1891	12,209	......	3,092	......	71	372	85	......	94	84	24	102	378	720
1892	13,147	......	5,411	......	79	248	60	......	299	113	50	46	741	783
1893	12,174	......	3,074	......	70	288	65	......	213	41	27	86	507	690
1894	11,733	......	2,966	......	69	264	54	20	161	28	19	142	367	741
1895	12,148	18.7	3,217	......	70	402	49	......	84	96	34	110	340	767
1896	12,316	19.0	2,975	......	52	314	50	......	31	125	45	68	329	891
1897	11,822	17.7	2,625	......	52	247	36	......	11	32	23	50	327	610
1898	11,776	17.6	2,574	......	92	332	49	......	25	17	19	105	212	714
1899	11,854	17.0	2,499	......	84	318	31	1	26	53	30	75	231	625
1900	12,432	17.4	2,870	......	55	350	27	......	41	134	36	120	259	843
1901	11,926	17.5	2,309	2,744	43	238	32	6	79	56	25	49	234	471
1902	11,070	16.0	2,150	2,533	85	251	25	14	50	20	14	88	175	467
1903	11,619	16.7	2,175	2,752	34	178	19	1	86	35	30	104	136	384
1904	12,461	18.0	2,450	2,981	73	246	14	......	35	94	22	58	163	451

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—HUDSON VALLEY DISTRICT—(*Concluded*).

YEAR.	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
	OTHER CAUSES OF DEATH.										
1885	1,295	1,059	99	496	370	717	1,216	238	333	523	767
1886	1,330	1,167	99	706	370	844	964	232	386	722	798
1887	1,331	946	107	642	326	957	955	233	413	1,187	801
1888	1,258	1,230	85	674	415	900	1,152	264	412	1,417	965
1889	1,454	1,310	83	725	453	1,043	1,134	291	425	1,090	815
1890	1,329	747	74	818	528	1,002	1,401	292	411	841	833
1891	1,343	2,053	81	912	545	1,045	1,539	300	505	990	957
1892	1,369	2,167	104	867	587	1,069	1,687	330	561	894	1,093
1893	1,244	1,827	114	872	600	1,117	1,577	356	536	853	1,091
1894	1,305	1,570	90	816	731	997	1,512	332	542	796	1,180
1895	1,298	1,696	79	823	711	1,026	1,634	356	476	805	1,184
1896	1,414	1,574	52	876	715	1,119	1,649	404	577	766	1,125
1897	1,316	1,755	78	863	783	1,241	1,632	425	521	765	1,056
1898	1,258	1,492	82	827	772	1,254	1,719	419	578	785	1,025
1899	1,313	1,541	62	822	756	1,251	1,646	415	582	765	1,227
1900	1,373	1,606	75	857	781	1,276	1,668	476	531	731	1,193
1901	1,342	1,519	87	968	774	1,324	1,657	456	657	720	1,186
1902	1,180	1,279	61	837	811	1,458	1,493	497	629	594	1,092
1903	1,259	1,391	73	847	939	1,556	1,509	536	707	586	1,209
1904	1,346	1,403	68	959	941	1,542	1,617	535	660	624	1,510

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—ADIRONDACK AND NORTHERN DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	2,428	....	626	....	20	47	12	1	19	11	11	28	175	113
1886	2,479	....	616	....	25	51	5	....	19	18	9	40	110	144
1887	2,969	....	710	....	36	71	11	....	28	16	19	20	147	189
1888	3,435	....	823	....	36	63	10	3	39	30	8	8	160	208
1889	3,129	....	735	....	13	72	15	....	9	16	6	34	106	194
1890	3,825	....	795	....	19	51	12	....	12	25	10	32	145	166
1891	4,131	....	888	....	23	81	18	....	23	10	12	12	141	286
1892	4,534	....	924	....	34	89	13	....	23	50	15	23	133	208
1893	4,367	....	881	....	13	89	9	....	43	14	11	41	177	186
1894	4,435	....	890	....	29	100	4	....	25	6	18	31	123	255
1895	4,263	13.0	904	....	18	108	4	....	29	2	9	22	79	22[illegible]
1896	4,447	13.0	862	....	29	77	....	....	24	41	15	16	121	237
1897	5,257	14.5	1,011	....	23	96	6	....	6	27	11	28	132	240
1898	5,187	14.7	984	....	27	122	5	....	3	30	9	43	59	307
1899	5,332	14.0	994	....	37	139	4	....	19	2	10	44	54	270
1900	5,430	14.2	1,083	....	36	152	5	....	23	48	25	24	74	393
1901	5,611	14.0	1,155	1,582	31	97	3	4	35	83	22	36	93	229
1902	4,981	13.0	937	1,454	30	99	5	9	28	25	14	24	46	167
1903	5,305	13.4	927	1,518	26	112	3	2	22	14	18	18	57	204
1904	5,728	14.5	1,056	1,754	27	128	....	1	29	3	15	32	65	131

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—ADIRONDACK AND NORTHERN DISTRICT—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	359	268	38	149	84	209	253	66	89	217	269
1886	342	220	51	177	93	193	262	92	92	323	212
1887	366	236	32	169	79	182	253	112	106	626	268
1888	381	371	48	226	78	221	317	94	102	743	290
1889	381	330	32	216	117	237	364	110	114	484	289
1890	415	554	38	298	130	287	370	115	132	454	370
1891	460	478	37	323	171	388	433	128	177	556	388
1892	482	603	38	356	174	439	518	133	178	567	458
1893	459	561	44	340	197	402	508	157	163	523	430
1894	510	504	47	326	225	435	514	145	165	501	472
1895	488	459	55	323	195	445	532	173	179	480	437
1896	520	453	35	338	248	472	561	192	215	432	426
1897	571	672	50	377	321	594	627	213	241	539	483
1898	581	551	55	436	304	567	678	212	239	502	462
1899	525	693	39	404	319	552	669	212	207	586	549
1900	539	616	46	399	318	573	678	234	231	470	546
1901	564	703	45	441	322	627	708	208	249	483	628
1902	521	459	42	399	311	591	681	229	262	469	570
1903	493	515	46	446	342	676	685	239	270	480	637
1904	552	545	55	415	351	790	754	255	289	452	839

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—MOHAWK VALLEY DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	3,174	....	647	....	32	62	19	....	19	36	20	12	142	183
1886	3,559	....	946	....	54	78	22	....	38	....	13	29	131	192
1887	4,359	....	1,039	....	33	89	14	....	32	25	8	21	294	321
1888	4,594	....	1,106	....	19	101	19	....	18	22	9	20	301	283
1889	4,643	....	1,152	....	32	99	17	1	30	26	11	28	249	305
1890	5,178	....	1,151	....	32	159	32	....	41	21	9	20	273	292
1891	5,978	....	1,310	....	25	166	23	....	62	26	13	30	188	315
1892	6,356	....	1,278	....	28	178	23	....	90	33	17	30	290	264
1893	5,497	....	1,231	....	19	118	16	....	67	22	16	25	209	293
1894	5,375	....	1,286	....	19	112	13	1	64	1	16	38	151	350
1895	5,358	15.3	1,133	....	24	106	7	....	25	1	16	36	60	297
1896	5,714	16.4	1,300	....	35	135	6	....	23	109	22	49	86	388
1897	5,611	16.0	1,025	....	20	96	5	....	13	25	11	21	109	244
1898	5,883	15.5	1,185	....	40	128	3	....	10	24	12	30	89	382
1899	6,037	15.5	1,060	....	32	90	3	1	13	3	12	52	114	256
1900	6,164	15.5	1,375	....	26	139	5	2	18	67	15	50	132	405
1901	6,455	16.0	1,195	1,737	28	110	4	4	25	49	25	37	142	264
1902	6,039	15.0	1,252	1,609	26	84	1	2	77	16	11	10	121	264
1903	6,534	15.1	1,358	1,755	28	101	1	2	60	17	18	79	97	280
1904	6,846	16.0	1,389	1,915	41	85	....	....	78	16	15	36	108	268

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—MOHAWK VALLEY DISTRICT—(*Concluded*).

YEAR.	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
	OTHER CAUSES OF DEATH.										
1885	456	366	41	185	111	263	452	99	115	293	268
1886	471	359	30	286	146	266	426	115	143	460	300
1887	485	364	33	274	156	319	474	165	173	712	367
1888	530	469	43	265	167	330	473	166	212	768	385
1889	527	477	30	303	189	436	549	180	187	631	412
1890	582	693	41	403	228	414	694	154	209	691	400
1891	646	813	44	445	297	524	771	194	230	694	438
1892	661	909	50	443	294	575	850	209	257	699	458
1893	564	702	40	403	323	523	728	200	237	527	465
1894	602	596	34	430	303	462	729	176	254	500	525
1895	603	607	45	389	360	529	715	207	228	536	557
1896	596	655	42	422	340	551	720	189	273	502	574
1897	533	759	62	432	359	570	789	243	277	541	503
1898	606	591	43	427	403	617	828	264	305	482	541
1899	549	807	45	468	431	691	802	255	284	555	824
1900	559	713	46	479	386	625	798	295	331	453	620
1901	608	887	48	512	438	677	828	267	340	473	689
1902	517	631	38	506	426	703	859	282	401	440	668
1903	570	673	49	497	488	775	911	276	371	403	773
1904	579	756	58	550	467	817	878	314	433	481	866

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—SOUTHERN TIER DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	EPIDEMIC DISEASES.									
					Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	1,741	....	404	....	10	41	21	....	20	18	14	14	48	97
1886	1,852	....	442	....	10	49	25	....	10	5	13	10	76	111
1887	2,513	....	580	....	19	76	33	....	24	6	11	8	111	178
1888	3,276	....	700	....	23	93	42	....	34	32	9	13	112	177
1889	3,390	....	684	....	20	115	24	1	34	10	7	22	117	196
1890	3,854	....	786	....	23	91	22	....	30	35	8	58	136	207
1891	4,648	....	839	....	22	132	10	1	34	32	7	12	195	248
1892	4,934	....	880	....	24	107	7	....	46	14	13	25	248	207
1893	4,838	....	940	....	28	105	8	....	68	51	17	19	294	241
1894	4,862	....	993	....	27	126	12	2	32	6	15	55	192	281
1895	4,780	12.0	930	....	15	118	13	....	7	13	18	33	99	242
1896	4,754	13.0	678	....	18	152	9	....	11	14	12	10	74	239
1897	5,523	14.0	811	....	8	75	11	....	13	27	16	51	91	204
1898	5,462	14.0	891	....	16	112	18	....	15	36	11	35	72	327
1899	5,930	14.0	860	....	30	121	3	....	28	11	6	39	75	225
1900	5,918	14.0	1,003	....	21	141	10	....	28	34	14	42	115	323
1901	5,982	14.0	951	1,784	21	107	8	....	19	33	19	67	80	170
1902	5,811	14.0	987	1,807	19	101	6	6	30	29	23	20	121	198
1903	5,966	13.9	943	1,767	17	111	5	....	29	13	14	60	75	178
1904	6,792	15.5	1,032	1,135	19	93	7	1	59	58	22	21	103	152

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—SOUTHERN TIER DISTRICT—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	199	195	31	132	51	145	253	68	86	135	163
1886	187	180	27	141	58	151	233	83	86	207	190
1887	236	233	31	175	57	169	292	74	140	415	225
1888	330	384	31	229	117	230	317	112	166	530	277
1889	300	361	35	254	128	282	416	120	147	436	355
1890	345	539	42	292	131	323	451	139	239	444	299
1891	412	651	36	377	177	415	566	151	233	549	378
1892	438	743	50	391	229	484	565	172	251	548	372
1893	372	584	52	376	239	472	594	164	250	513	391
1894	394	547	53	427	241	452	586	191	235	500	485
1895	413	606	36	370	274	485	574	182	251	559	452
1896	411	501	37	438	291	543	618	217	275	503	391
1897	390	624	66	452	339	623	694	260	332	533	427
1898	401	548	45	444	366	643	780	253	332	546	462
1899	485	699	45	506	374	737	792	280	295	631	548
1900	452	648	52	448	414	683	794	287	308	544	560
1901	441	716	35	499	423	673	838	261	368	550	654
1902	431	574	49	510	407	787	830	259	350	512	549
1903	378	569	53	496	387	902	784	309	385	509	692
1904	459	720	54	570	477	939	906	338	446	550	798

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—EAST CENTRAL DISTRICT.

YEAR	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	2,444	......	537	......	26	48	21	1	10	14	11	8	80	146
1886	2,947	......	610	......	20	81	19	1	8	5	26	8	119	151
1887	3,465	......	765	......	12	71	40	......	17	17	12	28	106	196
1888	4,222	......	949	......	22	121	37	1	39	53	13	16	182	307
1889	4,290	......	921	......	23	103	39	15	52	16	11	21	145	346
1890	4,918	......	973	......	24	91	25	......	24	36	4	34	112	281
1891	5,113	......	1,066	......	28	135	24	......	25	19	14	17	89	350
1892	5,467	......	1,054	......	29	78	25	1	26	14	27	22	172	254
1893	5,493	......	1,114	......	21	100	17	......	26	71	17	34	257	264
1894	5,224	......	1,060	......	22	116	10	1	23	1	17	28	160	334
1895	5,422	15.5	1,087	......	24	107	17	......	33	4	15	25	71	292
1896	5,371	15.4	1,070	......	27	96	12	......	40	17	11	15	111	336
1897	5,758	16.0	1,042	......	30	70	8	......	21	62	12	39	126	222
1898	5,745	16.0	1,019	......	15	123	14	......	22	35	13	21	91	309
1899	5,687	14.0	788	......	22	107	5	......	14	5	13	38	47	195
1900	5,796	14.0	1,028	......	22	110	10	......	19	47	22	38	61	395
1901	5,801	14.5	894	1,821	21	104	4	2	27	75	14	29	64	181
1902	5,481	14.0	852	1,765	20	72	1	......	9	10	13	30	44	182
1903	5,781	14.3	878	1,870	12	70	1	......	14	30	10	50	50	160
1904	6,422	16.0	961	2,094	30	80	2	......	38	24	20	10	59	135

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—EAST CENTRAL DISTRICT—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	342	286	22	149	86	197	291	89	104	212	301
1886	388	321	46	209	101	251	335	110	139	387	224
1887	410	324	47	193	123	274	376	107	166	730	216
1888	467	391	68	237	138	348	446	152	178	762	254
1889	476	434	69	267	176	377	497	158	150	660	244
1890	533	732	44	344	197	454	503	178	227	575	496
1891	546	612	38	380	275	431	616	172	214	717	412
1892	536	780	42	429	256	558	686	195	248	668	441
1893	537	733	48	418	268	551	662	192	243	587	445
1894	565	555	50	406	278	503	649	233	244	539	490
1895	534	655	31	416	316	593	682	255	294	537	552
1896	502	579	40	428	309	640	690	258	266	503	495
1897	557	708	51	464	345	738	757	268	280	538	468
1898	519	615	36	461	361	707	761	305	310	536	491
1899	485	744	41	464	352	719	763	310	275	581	507
1900	513	583	34	470	378	720	760	329	276	474	535
1901	563	649	49	457	360	798	765	295	261	528	555
1902	482	514	51	478	415	786	783	306	287	441	560
1903	479	626	45	458	414	885	773	314	322	468	600
1904	567	734	38	482	459	900	843	325	345	535	796

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—WEST CENTRAL DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases.									
					Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	1,812	......	306	......	15	45	24	......	3	3	12	7	41	90
1886	2,056	......	383	......	14	42	22	......	5	1	6	15	42	112
1887	2,474	......	457	......	8	47	24	......	......	4	12	11	76	144
1888	2,950	......	412	......	24	51	20	2	27	11	8	2	69	112
1889	2,918	......	459	......	14	58	24	4	23	4	7	11	79	136
1890	3,660	......	602	......	15	64	17	1	24	55	9	28	60	163
1891	4,040	......	519	......	18	72	11	2	30	10	11	15	36	153
1892	4,349	......	556	......	20	61	18	......	23	8	19	22	84	124
1893	3,865	......	600	......	12	61	14	......	32	14	12	19	167	146
1894	3,868	......	562	......	17	65	16	1	23	3	12	12	62	158
1895	4,019	13.4	573	......	13	82	13	......	8	5	14	18	56	179
1896	4,086	13.0	638	......	9	54	20	......	21	20	11	20	39	217
1897	4,351	14.5	560	......	21	45	14	......	9	14	14	18	59	137
1898	4,243	14.3	610	......	9	39	11	......	7	10	7	23	24	219
1899	4,565	14.0	568	......	25	50	8	......	21	9	9	7	60	159
1900	4,461	14.0	654	......	13	91	5	......	15	24	6	27	70	253
1901	4,577	14.3	624	1,646	10	60	6	......	10	29	12	46	28	128
1902	4,448	14.0	593	1,577	12	50	8	6	5	3	15	23	33	156
1903	4,822	15.0	608	1,710	6	116	5	......	6	15	20	16	40	128
1904	4,970	15.5	620	1,871	13	65	6	......	7	13	22	7	48	130

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—WEST CENTRAL DISTRICT—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	281	196	22	138	85	167	275	58	80	218	152
1886	290	178	24	115	94	151	295	72	93	306	179
1887	285	192	23	149	94	162	256	94	101	594	198
1888	330	234	28	185	102	223	339	87	118	749	229
1889	322	293	18	200	137	255	366	104	146	510	227
1890	391	466	21	291	200	361	440	144	153	509	250
1891	428	443	32	312	204	430	529	169	184	639	322
1892	441	599	40	333	197	499	612	171	198	564	287
1893	409	418	35	309	203	386	511	156	187	457	317
1894	459	370	25	313	336	466	537	153	166	448	326
1895	398	468	27	350	255	461	520	162	160	493	337
1896	375	379	30	337	268	510	642	177	182	430	345
1897	392	507	48	359	289	563	677	199	234	441	311
1898	384	421	33	373	322	530	635	218	216	421	341
1899	395	567	23	355	246	635	697	213	211	486	389
1900	375	418	28	346	285	594	658	232	224	415	382
1901	363	526	32	364	305	625	711	227	235	416	444
1902	341	430	30	351	288	710	678	246	251	399	413
1903	355	491	30	379	300	727	732	276	293	420	467
1904	357	513	33	378	352	758	757	250	296	438	527

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—LAKE ONTARIO AND WESTERN DISTRICT.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases.									
					Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Diphtheria.	Diarrhea.
1885	4,745	......	1,258	......	24	99	31	......	53	31	31	22	235	285
1886	7,448	......	2,629	......	70	133	63	......	74	6	36	41	434	598
1887	9,065	......	3,370	......	65	175	70	......	124	100	23	35	528	1,018
1888	10,530	......	3,887	......	72	243	86	46	123	69	32	30	538	1,047
1889	9,726	......	3,397	......	81	208	63	9	68	19	24	126	348	840
1890	11,120	......	3,860	......	107	250	89	......	64	109	29	43	363	844
1891	12,988	......	4,270	......	91	306	67	......	126	79	35	54	556	961
1892	11,820	......	4,331	......	71	269	55	......	171	25	58	112	675	923
1893	12,649	......	4,242	......	60	267	27	......	238	38	39	74	499	1,238
1894	11,721	......	3,941	......	50	295	16	2	115	26	33	114	472	1,217
1895	11,519	15.5	3,534	......	47	227	24	......	38	123	26	72	454	1,041
1896	11,193	15.0	3,367	......	49	188	19	......	43	53	22	86	437	1,055
1897	11,368	15.3	3,021	......	51	187	15	......	44	66	24	110	390	865
1898	11,446	15.4	2,842	......	92	224	18	......	27	7	16	97	179	956
1899	11,981	13.7	2,867	......	58	201	9	1	59	73	32	66	197	845
1900	12,278	14.0	3,240	......	48	205	7	1	66	116	23	103	202	1,055
1901	12,875	15.0	2,983	3,098	81	250	4	3	57	65	38	123	238	780
1902	12,292	14.0	2,930	2,753	50	252	5	83	48	89	31	67	208	694
1903	13,498	15.0	3,120	3,017	60	280	3	29	82	77	39	108	318	681
1904	13,921	15.5	3,171	3,268	73	229	9	2	71	46	49	35	306	740

MORTALITY IN THE SANITARY DISTRICTS SINCE 1885—LAKE ONTARIO AND WESTERN DISTRICT—(*Concluded*).

YEAR.	Other Causes of Death.										
	Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	617	460	73	280	189	337	658	177	198	390	555
1886	937	707	55	441	226	488	1,047	204	304	579	1,005
1887	950	750	52	540	267	479	1,249	259	389	975	1,017
1888	1,091	1,033	116	687	320	666	1,397	275	528	848	1,283
1889	1,016	1,029	107	670	341	688	1,285	307	503	778	1,336
1890	1,180	1,623	80	889	389	693	1,417	313	564	653	1,419
1891	1,347	1,989	119	1,000	560	868	1,598	392	596	816	1,634
1892	1,281	1,839	91	986	505	905	1,618	333	630	824	1,449
1893	1,179	1,510	121	1,017	542	982	1,688	393	649	823	1,265
1894	1,204	1,324	90	769	521	959	1,565	425	595	785	1,144
1895	1,209	1,552	113	758	583	1,014	1,487	414	547	788	1,001
1896	1,133	1,355	105	742	680	1,078	1,465	459	569	762	893
1897	1,075	1,482	122	792	693	1,116	1,509	495	615	835	882
1898	1,038	1,394	103	814	749	1,173	1,549	530	634	830	1,017
1899	1,114	1,623	93	837	773	1,231	1,553	548	600	870	1,198
1900	1,129	1,408	111	841	824	1,274	1,588	569	663	859	1,186
1901	1,155	1,579	116	967	765	1,337	1,618	665	820	814	1,400
1902	1,030	1,301	101	913	805	1,412	1,670	624	807	787	1,315
1903	1,078	1,454	126	1,046	873	1,595	1,797	678	893	809	1,472
1904	1,175	1,596	118	1,041	842	1,681	1,756	713	839	853	1,747

MORTALITY OF THE STATE SINCE 1885.

YEAR.	All deaths.	Death rate.	Deaths under five years of age.	Deaths at 70 years and over.	Epidemic Diseases. Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.	Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diptheria.	Diarrhea.
1885	80,407	......	30,027	......	446	1,067	944	33	1,184	1,170	354	834	4,508	7,301
1886	86,801	......	32,928	......	572	1,169	899	39	1,011	895	357	1,244	5,597	7,028
1887	96,453	......	35,114	......	540	1,327	985	175	1,267	1,205	327	447	6,490	9,258
1888	104,450	......	38,345	......	490	1,483	813	212	2,452	944	342	994	6,448	8,774
1889	104,233	......	40,243	......	402	1,550	746	30	2,205	899	293	1,308	5,855	8,294
1890	116,830	......	37,392	......	474	1,612	738	4	913	1,161	312	1,156	4,915	8,468
1891	123,790	......	42,740	......	589	1,926	619	4	2,252	1,200	367	825	5,072	9,179
1892	126,302	......	42,434	......	649	1,664	613	143	2,177	1,350	477	921	5,918	9,185
1893	123,908	......	41,643	......	875	1,685	493	252	1,626	789	366	1,203	5,947	9,056
1894	118,195	......	41,472	......	489	1,640	422	308	1,227	900	331	1,020	6,592	8,956
1895	121,735	......	42,002	......	546	1,716	409	11	850	1,266	370	1,169	4,989	9,055
1896	120,683	18.5	40,136	......	510	1,542	449	3	759	1,495	340	996	4,597	8,776
1897	117,078	18.4	35,771	......	538	1,351	380	27	841	878	308	825	4,115	7,267
1898	120,938	18.1	37,113	......	695	1,810	404	1	837	838	237	1,155	2,612	8,499
1899	121,831	17.3	35,386	......	702	1,604	248	21	730	756	353	886	2,786	6,480
1900	128,468	17.8	39,204	......	531	1,948	309	14	689	1,833	466	1,020	3,306	7,959
1901	129,257	17.8	35,775	22,233	492	1,741	283	445	1,430	859	363	721	3,026	9,337
1902	123,494	17.0	31,215	20,709	456	1,318	189	442	1,215	929	314	923	2,859	8,315
1903	126,536	16.7	32,768	22,050	454	1,665	187	41	1,057	721	354	811	3,035	7,480
1904	141,804	18.2	39,086	24,742	1,708	1,652	149	13	1,194	1,170	430	426	3,041	8,329

MORTALITY OF THE STATE SINCE 1885—(*Concluded*).

YEAR.	Other Causes of Death: Consumption.	Acute respiratory diseases.	Puerperal.	Digestive.	Urinary.	Circulatory.	Nervous.	Cancer.	Violence.	Old age.	Unclassified.
1885	11,238	10,864	974	4,343	4,069	4,903	8,651	1,887	2,994	4,889	7,728
1886	11,947	11,389	884	5,066	4,305	5,238	8,799	2,050	3,296	5,990	8,981
1887	11,609	11,557	885	5,599	4,582	5,737	9,957	2,363	3,780	8,676	9,736
1888	12,383	13,756	1,069	6,146	4,926	6,394	11,174	2,497	3,842	7,994	11,310
1889	12,390	13,833	979	6,501	5,732	6,886	11,266	2,638	3,834	5,980	12,615
1890	13,831	18,053	928	7,696	5,688	7,306	11,593	2,868	4,542	5,484	18,728
1891	13,445	20,647	1,053	8,486	6,473	8,480	13,166	3,028	5,028	6,530	15,371
1892	13,471	20,432	1,131	8,920	6,502	9,013	14,009	3,152	5,543	6,385	14,647
1893	13,123	19,807	1,054	8,834	6,955	9,042	13,826	3,232	5,295	5,826	14,622
1894	12,824	15,885	911	8,745	6,946	8,451	12,948	3,305	5,487	5,497	15,310
1895	13,267	17,725	939	8,892	7,449	9,966	11,724	3,554	5,889	5,569	16,380
1896	13,265	16,820	972	8,955	7,770	10,486	11,925	3,789	7,022	5,377	14,835
1897	12,641	16,277	1,013	8,963	7,866	10,905	12,124	4,131	6,172	5,516	14,950
1898	12,979	16,350	920	10,101	8,641	10,511	13,312	4,385	6,520	5,524	14,641
1899	13,412	17,938	877	10,163	9,064	10,606	13,177	4,533	6,098	6,068	15,324
1900	13,590	19,232	1,136	10,644	9,501	10,676	12,993	4,871	6,714	5,402	16,134
1901	13,766	17,589	1,068	7,478	9,558	11,949	13,366	5,033	7,926	5,439	17,388
1902	12,582	16,986	1,034	7,235	9,604	12,889	12,964	4,990	7,058	4,949	15,833
1903	13,194	17,339	1,110	7,282	9,998	13,561	12,966	5,456	7,646	4,765	17,466
1904	14,159	21,132	1,272	7,866	10,815	14,309	14,142	5,697	8,822	5,120	19,858

Population of the Sanitary Districts by U. S. Census.

	1890.	1900.
Maritime district	2,778,630	3,753,614
Hudson Valley district	679,647	690,000
Adirondack and Northern district	379,577	394,772
Mohawk Valley district	368,503	408,974
Southern tier district	401,954	428,543
East Central district	382,960	401,082
West Central district	314,875	315,945
Lake Ontario and Western district	718,473	876,206
Entire State	6,024,619	7,269,136

TABLES SHOWING THE RELATIVE MORTALITY OF CERTAIN DISEASES GEOGRAPHICALLY FOR 10 YEARS.

In each 1000 deaths there were from Diarrhea in the—

DISTRICTS.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
Maritime	80	71	70	74	55	56	93	85	75	76
Hudson valley	63	72	51	60	52	68	40	42	35	36
Adirondack and Northern	53	53	45	60	50	72	41	33	38	23
Mohawk valley	55	60	43	65	42	65	41	44	35	40
Southern tier	50	50	39	60	38	55	30	34	35	23
East central	56	62	38	54	34	68	31	33	28	20
West central	45	53	31	52	34	57	28	35	26	26
Lake Ontario and Western	100	93	76	90	70	86	60	56	50	53
Entire State	75	73	63	70	53	62	72	67	60	60

In each 1000 deaths there were from diphtheria in the—

DISTRICTS.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902	1903.	1904.
Maritime	52	45	43	21	28	32	28	28	31	26
Hudson valley	28	26	28	18	19	21	20	16	12	13
Adirondack and Northern	18	27	25	11	10	14	17	9	10	11
Mohawk valley	11	15	20	15	19	20	22	20	16	15
Southern tier	21	15	17	13	13	20	13	21	14	19
East central	13	20	22	16	9	10	11	8	9	9
West central	14	10	14	6	12	15	8	8	8	10
Lake Ontario and Western	39	40	34	16	16	16	18	17	22	22
Entire State	41	38	35	22	23	25	23	23	24	21

In each 1000 deaths there were from typhoid fever in the—

DISTRICTS.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
Maritime	8	8	8	10	8	10	10	11	10	9
Hudson valley	33	85	21	28	26	28	20	23	14	20
Adirondack and Northern	25	26	18	23	26	26	17	20	21	22
Mohawk valley	20	13	17	22	13	23	17	14	16	13
Southern tier	26	32	14	20	20	24	18	17	20	11
East central	20	18	12	21	19	20	18	13	14	12
West central	10	13	10	10	11	20	13	11	24	13
Lake Ontario and Western	20	16	16	21	17	17	20	20	21	17
Entire State	14	13	12	15	13	17	13	14	14	12

In each 1000 deaths there were from scarlet fever in the—

DISTRICTS.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
Maritime	8	8	9	10	8	6	15	13	10	11
Hudson valley	7	3	1	2	2	4	7	5	7	3
Adirondack and Northern	5	6	1	1	4	4	6	6	4	5
Mohawk valley	4	5	2	2	2	3	4	13	11	11
Southern tier	1	2	2	3	5	5	3	5	5	9
East central	6	9	3	4	3	3	5	2	2	6
West central	2	5	2	2	5	3	2	1	1	1
Lake Ontario and Western	3	4	4	3	5	5	4	4	6	2
Entire State	7	6	7	7	6	5	11	11	8	8

In each 1000 deaths there were from measles in the—

DISTRICTS.	1900.	1901.	1902.	1903.	1904.
Maritime	11	6	10	7	11
Hudson valley	10	5	2	3	8
Adirondack and Northern	9	15	5	3	1
Mohawk valley	11	8	3	3	2
Southern tier	6	5	5	2	9
East central	8	13	2	5	4
West central	5	6	3	3	3
Lake Ontario and Western	10	5	7	6	3
Entire State	10	6	8	9	10

In each 1000 deaths there were from consumption in the—

DISTRICTS.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
Maritime	112	110	106	115	135	114	115	110	117	110
Hudson valley	107	115	112	115	110	110	113	107	100	108
Adirondack and Northern	114	116	108	112	99	100	110	105	92	96
Mohawk valley	113	104	95	106	91	90	93	85	90	85
Southern tier	86	86	75	75	83	76	75	75	65	69
East central	98	93	96	90	85	90	96	90	80	87
West central	100	90	90	90	87	84	80	77	75	71
Lake Ontario and Western	105	101	95	100	93	92	90	85	80	85
Entire State	109	110	108	108	110	110	106	102	104	100

In each 1000 deaths there were from pneumonia in the—

DISTRICTS.	1903.	1904.
Maritime	89	110
Hudson valley	70	78
Adirondack and Northern	57	60
Mohawk valley	64	73
Southern tier	55	70
East central	64	83
West central	60	72
Lake Ontario and Western	51	65
Entire State	80	95

Percentage of acute respiratory diseases to total mortality in the—

DISTRICTS.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
Maritime	14.5	15.0	16.0	17.4	14.5	16.0	16.0	17.5
Hudson valley	15.0	12.5	13.0	13.0	13.0	11.7	12.5	12.0
Adirondack and Northern	12.8	11.0	13.1	11.3	12.5	9.2	9.7	9.6
Mohawk valley	13.5	10.0	13.5	11.5	13.7	10.5	10.3	11.1
Southern tier	12.0	10.0	11.7	11.0	12.0	10.0	9.5	10.5
East central	12.3	11.0	13.0	10.0	11.2	9.5	10.8	11.5
West central	11.7	10.0	12.5	9.4	11.5	9.5	10.2	10.3
Lake Ontario and Western	13.0	12.1	13.5	11.5	12.5	10.5	10.7	11.4
Entire State	14.0	13.5	14.7	15.0	13.5	13.8	13.7	15.0

This table includes pneumonia with other acute respiratory diseases.

Grippe and the acute respiratory mortality.—It is impossible to state the actual mortality from epidemic influenza. Certain data have been collected and the mortality estimated of the thirteen epidemics which have occurred prior to this present year. The existence of these periods of very extensive prevalence has been

noted and accepted, but if the returns on death certificates were taken as the measure of the number of deaths they have caused it would be found very small—far smaller than any one believes it to be. For instance, in February, when the epidemic of the year had existed two months with exceptional severity, on only 250 death certificates out of 5,000 was grippe mentioned either as the direct or contributory cause of death. It finds expression in the increase of mortality from local diseases and mostly those of the respiratory organs, and as these increase during its prevalence its mortality can be estimated. At any rate, this has been the way in which past epidemics have been counted, and these estimates, with one for this year, are as follows:

Time of occurrence.	Height reached.	Duration.	Number of deaths.
1890	January, 1890	3 months	5,000
1891	April, 1891	6 months	8,000
1891–92	January, 1892	5 months	8,000
1893	April, 1893	6 months	6,000
1893–94	January, 1894	4 months	3,000
1895	February, 1895	4 months	5,000
1896	March, 1896	5 months	2,750
1897	March, 1897	4 months	3,000
1898	March, 1898	6 months	2,500
1898–99	January, 1899	5 months	7,000
1900	March, 1900	6 months	11,500
1901	January, 1901	5 months	7,000
1902	February, 1902	6 months	5,000
1903	March, 1903	6 months	8,000
1904	March, 1904	6 months	10,000

Cancer.—There were 5,700 deaths from cancer this year, the largest number on record. These tables show the increase to be constant.

Reported mortality from cancer in the sanitary districts for 8 years—

DISTRICTS.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
Maritime	1,805	1,894	2,031	2,174	2,302	2,449	2,651	2,557	2,828	2,967
Hudson valley	356	404	425	419	415	476	459	497	536	535
Adirondack and Northern	173	192	213	212	212	234	208	220	239	255
Mohawk valley	207	189	242	264	255	295	267	282	276	314
Southern tier	182	217	260	253	280	287	261	259	309	338
East central	255	258	268	305	310	329	295	304	314	325
West central	162	177	199	218	213	232	227	246	276	250
Lake Ontario and Western	414	459	495	530	548	569	665	624	678	713
Entire State	3,554	3,790	4,133	4,375	4,535	4,871	5,033	4,989	5,456	5,697

Following the estimated population of the *Monthly Bulletin*, there were in the sanitary districts:

Deaths from cancer per 100,000 population—

DISTRICTS.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	Average for 7 years.
Maritime	58	57	62	66	65	61	71	53
Hudson valley	60	56	68	67	72	77	78	68
Adirondack and Northern	54	54	60	53	58	60	64	58
Mohawk valley	67	65	74	65	67	66	73	68
Southern tier	60	64	65	63	60	72	78	66
East central	74	74	79	74	76	79	80	77
West central	70	65	71	71	78	86	80	74
Lake Ontario and Western	61	61	65	75	71	75	78	70

Record of each reporting local board of health, showing total deaths from all causes and from the principal zymotic diseases for 1904, *by counties*

[Cities are printed in SMALL CAPS, villages in *italic* and towns in Roman type.]

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Albany county	**171,430**	**3,045**	**26**	**64**	**2**	**14**	**1**	**4**	**24**	**103**	**332**
ALBANY	100,000	1,848	19	18	2	9	......	3	11	61	216
COHOES	24,000	459	2	25	......	5	......	1	7	16	60
Berne	1,917	31	......	......	......	......	......	......	......	......	2
Bethlehem	4,226	57	......	4	......	......	......	......	......	1	4
Coeymans	3,952	65	1	2	......	......	......	......	......	3	4
Guilderland	3,530	43	......	1	......	......	......	......	......	2	1
Knox	1,244	10	......	......	......	......	......	......	......	......	......
New Scotland	3,058	37	......	......	......	......	......	......	......	......	......
Rensselaerville	1,795	25	......	......	......	......	......	......	......	1	1
Colonie	7,035	141	1	4	......	......	......	......	......	5	7
Westerlo	1,632	32	......	......	......	......	......	......	......	......	2
WATERVLIET	14,321	225	2	9	......	......	1	......	4	14	23
Green Island	4,770	72	1	1	......	......	......	......	2	......	12
Allegany county	**41,501**	**590**	**1**	**3**	**1**	**1**	**2**	**1**	**1**	**3**	**14**
Alfred	1,615	21	......	......	......	......	......	......	......	......	......
Allen	655	9	......	......	......	......	......	......	......	......	......
Alma	1,182	15	......	1	......	......	......	......	......	......	1
Almond	1,436	15	......	......	......	......	......	......	......	......	2
Amity	2,216	29	......	......	......	......	......	1	......	......	1
Andover	1,869	33	1	......	......	......	......	......	......	......	1
Angelica	1,639	54	......	......	......	......	......	......	......	......	1
Belfast	1,574	28	......	......	......	......	......	......	......	1	......

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Allegany county—(*continued*)											
Birdsall	634	9	......	......	......	......	......	......	......	......	......
Bolivar	2,035	22	......	......	......	......	......	......	......	1	......
Burns	1,424	28	......	......	......	......	......	......	......	......	......
Caneadea	1,310	16	......	......	......	......	......	......	......	......	......
Centerville	833	10	......	1	......	......	......	......	......	......	......
Clarksville	836	17	......	1	......	......	......	......	......	......	......
Cuba	2,369	34	......	......	......	......	......	......	......	......	1
Friendship	2,136	30	......	......	......	......	......	......	......	......	1
Genesee	1,052	7	......	......	......	......	......	......	......	......	......
Granger	800	10	......	......	......	......	......	......	......	......	......
Grove	812	10	......	......	......	......	......	......	......	......	......
Hume	1,749	20	......	......	......	......	......	......	......	......	......
Independence	1,280	3	......	......	......	......	......	......	......	......	......
New Hudson	926	6	......	......	......	......	......	......	......	......	1
Rushford	1,300	22	......	......	......	......	......	......	......	......	......
Scio	1,281	21	......	......	......	......	......	......	......	......	......
Ward	547	1	......	......	......	......	......	......	......	......	......
Wellsville	4,981	91	......	......	1	1	2	......	1	1	5
West Almond	601	10	......	......	......	......	......	......	......	......	......
Willing	1,246	5	......	......	......	......	......	......	......	......	......
Wirt	1,163	14	......	......	......	......	......	......	......	......	......
Broome county	69,149	1,259	......	5	2	5	25	3	18	28	93
BINGHAMTON	39,647	762	......	4	2	4	19	2	15	26	79
Barker	1,072	16	......	......	......	......	......	......	......	......	......
Binghamton	817	15	......	......	......	......	......	......	......	......	......

Chenango	1,372	20					1				
Colesville	2,773	33									4
Conklin	946	24									
Dickinson	728	42					1				1
Fenton	1,171	17									
Kirkwood	918	16		1						1	
Lisle	1,710	36									1
Maine	1,534	25									
Nanticoke	666	12									
Sanford	3,514	34									1
Triangle	1,727	21							1		
Union	5,707	116					3	1	2	1	5
Vestal	1,850	24				1					
Windsor	2,967	46					1				2
Cattaraugus county	65,643	885	8	7					6	16	39
OLEAN	9,612	138	2	2						3	11
Allegany	3,692	50	1						2	4	1
Ashford	1,645	8									
Carrollton	2,035	12									1
Cold Spring	1,030	12								1	
Conewango	1,224	9									
Dayton	1,691	21									1
East Otto	1,138	11									
Elko	571	6									
Ellicottville	2,038	44							3		1
Farmersville	1,013	6									
Franklinville	2,514	34									
Freedom	1,209	19									
Great Valley	1,697	29									1
Hinsdale	1,218	9									
Humphrey	794	9									
Ischua	832	11								1	
Leon	1,063	8		1							1
Little Valley	1,616	23		1							2
Lyndon	609	4									

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Cattaragus county–(*continued*)											
Machias	1,557	28	....	1	....	....	....	....	....	....	3
Mansfield	968	6	....	....	....	....	....	....	....	....	....
Napoli	967	13	....	....	....	....	....	....	....	....	....
New Albion	2,372	33	....	....	....	....	....	....	....	1	....
Olean	4,854	70	....	....	....	....	....	....	1	2	4
Otto	1,105	12	....	1	....	....	....	....	....	....	....
Perrysburg	1,216	22	....	....	....	....	....	....	....	....	2
Persia	1,940	19	....	....	....	....	....	....	....	....	2
Portville	2,319	25	....	....	....	....	....	....	....	....	....
Randolph	2,605	47	....	....	....	....	....	....	....	1	3
Red House	973	4	....	....	....	....	....	....	....	....	....
Salamanca	4,251	97	....	1	....	....	....	....	....	3	4
Salamanca	923	8	....	....	....	....	....	....	....	....	1
South Valley	713	8	....	....	....	....	....	....	....	....	....
Yorkshire	1,738	30	....	....	....	....	....	....	....	....	1
Cayuga county	**70,889**	**1,059**	**3**	**16**	....	**1**	**2**	....	**14**	**27**	**71**
AUBURN	35,000	498	3	9	....	1	1	....	12	24	47
Aurelius	1,563	23	....	....	....	....	....	....	....	....	2
Brutus	2,582	48	....	....	....	....	....	....	1	....	2
Cato	1,624	26	....	....	....	....	....	....	....	....	2
Conquest	1,360	16	....	....	....	....	....	....	....	....	....
Fleming	1,076	21	....	....	....	....	....	....	....	....	2
Genoa	2,075	34	....	....	....	....	....	....	....	....	2
Ira	1,668	18	....	....	....	....	....	....	....	....	....
Ledyard	1,909	27	....	....	....	....	....	....	....	1	....

Locke	1,079	20	....	1	....	....	....	....	....	....	2
Ments	1,914	33	....	1	....	....	....	....	....	1	1
Montezuma	991	15	....	2	....	....	....	....	....	1	3
Moravia	2,373	35	....	....	....	....	....	....	....	....	....
Niles	1,402	28	....	....	....	....	....	....	....	....	1
Owasco	1,331	17	....	....	....	....	....	....	....	....	....
Scipio	1,657	26	....	1	....	....	....	....	....	....	....
Sempronius	896	13	....	....	....	....	....	....	....	....	1
Sennett	1,440	30	....	....	....	....	....	....	....	....	4
Springport	1,770	33	....	....	....	....	....	....	....	....	....
Sterling	2,516	41	....	1	....	....	1	....	....	....	....
Summer Hill	779	13	....	1	....	....	....	....	1	....	....
Throop	1,038	17	....	....	....	....	....	....	....	....	....
Venice	1,418	14	....	....	....	....	....	....	....	....	....
Victory	1,398	14	....	....	....	....	....	....	....	....	2
Chautauqua county;	**88,314**	**1,410**	**5**	**31**	**1**	**45**	**2**	**4**	**10**	**28**	**80**
DUNKIRK	11,616	274	....	6	....	41	1	1	3	15	12
JAMESTOWN	22,892	324	2	16	1	1	....	2	5	5	35
Arkright	918	13	....	....	....	....	....	....	....	1	....
Busti	2,192	21	....	....	....	....	....	....	....	....	....
Carroll	1,684	28	....	....	....	....	....	....	....	....	....
Charlotte	1,406	20	....	....	....	....	....	....	....	....	3
Chautauqua	3,590	73	....	2	....	....	....	....	....	....	2
Cherry Creek	1,745	28	....	....	....	....	....	....	....	2	1
Clymer	1,229	17	....	....	....	....	....	....	....	....	1
Dunkirk	454	0	....	....	....	....	....	....	....	....	....
Ellery	1,628	27	....	....	....	....	....	....	....	....	....
Ellicott	3,118	35	....	....	....	1	....	....	....	....	....
Ellington	1,330	22	....	....	....	....	....	....	....	....	2
Fredonia	4,127	79	....	1	....	1	....	1	....	....	4
French Creek	1,014	9	....	....	....	....	....	....	....	....	1
Gerry	1,198	27	....	....	....	....	....	....	....	....	1
Hanover	4,778	71	....	1	....	....	1	....	....	....	5
Harmony	2,988	31	....	....	....	....	....	....	1	....	2
Kiantone	491	6	....	....	....	....	....	....	....	1	....
Mina	1,038	12	....	1	....	....	....	....	....	....	....

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Chautauqua county—(*continued*)											
Poland	1,613	17	1	....	....	....	....	....	....	....	....
Pomfret	2,186	33	....	3	....	1	....	....	....	....	1
Portland	2,690	43	....	....	....	....	....	....	....	1	1
Ripley	2,256	36	....	....	....	....	....	....	....	1	1
Sheridan	1,633	20	....	....	....	....	....	....	....	....	....
Sherman	1,560	21	....	....	....	....	....	....	....	....	2
Stockton	1,852	27	1	....	....	....	....	....	....	....	1
Villanova	1,206	20	1	....	....	....	....	....	....	....	1
Westfield	1,452	20	....	....	....	....	....	....	....	....	....
Westfield	2,430	48	....	1	....	....	....	....	1	2	4
Chemung county	**54,063**	**833**	**4**	**21**	....	**2**	....	**3**	**17**	**22**	**57**
ELMIRA	35,672	560	4	18	....	2	....	1	15	22	40
Ashland	954	19	....	1	....	....	....	....	....	....	1
Baldwin	664	9	....	....	....	....	....	....	....	....	....
Big Flats	1,705	19	....	....	....	....	....	....	....	....	....
Catlin	1,109	11	....	....	....	....	....	....	....	....	....
Chemung	1,500	21	....	....	....	....	....	....	....	....	....
Elmira	1,260	33	....	....	....	....	....	....	....	....	3
Erin	996	11	....	....	....	....	....	....	....	....	....
Horseheads	4,944	61	....	2	....	....	....	2	....	....	8
Southport	2,201	27	....	....	....	....	....	....	1	....	3
Van Etten	1,406	26	....	....	....	....	....	....	....	....	....
Veteran	1,652	36	....	....	....	....	....	....	1	....	2

Chenango county	**36,566**	**636**	**3**	**2**	....	**1**	....	....	**2**	**4**	**21**
Afton	1,920	39	....	1	....	....	....	....	....	....	....
Bainbridge	1,991	36	....	....	....	....	....	....	2	....	2
Columbus	997	9	....	....	....	....	....	....	....	....	1
Coventry	987	11	....	....	....	....	....	....	....	....	1
German	423	3	....	....	....	....	....	....	....	....	....
Greene	3,152	71	....	....	....	....	....	....	....	1	1
Guilford	2,208	31	....	....	....	....	....	....	....	....	2
Lincklaen	646	8	....	....	....	....	....	....	....	....	....
McDonough	907	11	....	....	....	....	....	....	....	....	....
New Berlin	2,525	34	....	1	....	....	....	....	....	....	1
North Norwich	801	10	....	....	....	....	....	....	....	....	....
Norwich	1,238	23	....	....	....	....	....	....	....	....	....
Norwich	5,766	103	2	....	....	....	....	....	....	3	7
Otselic	1,234	25	1	....	....	....	....	....	....	....	....
Oxford	3,545	85	....	....	....	1	....	....	....	....	3
Pharsalia	780	7	....	....	....	....	....	....	....	....	....
Pitcher	751	10	....	....	....	....	....	....	....	....	2
Plymouth	1,026	16	....	....	....	....	....	....	....	....	....
Preston	662	17	....	....	....	....	....	....	....	....	....
Sherburne	2,614	42	....	....	....	....	....	....	....	....	....
Smithville	1,105	21	....	....	....	....	....	....	....	....	1
Smyrna	1,290	24	....	....	....	....	....	....	....	....	....
Clinton county	**47,430**	**597**	**1**	**4**	....	**11**	....	**2**	**4**	**13**	**38**
Altona	2,465	20	....	....	....	....	....	....	....	....	1
Ausable	2,195	36	....	....	....	....	....	....	....	....	3
Beekmantown	2,067	31	....	....	....	....	....	....	....	....	2
Black Brook	1,933	23	....	....	....	1	....	....	2	....	....
Champlain	4,748	49	1	1	....	....	....	1	....	2	2
Chazy	2,796	40	....	....	....	....	....	....	....	....	3
Clinton	1,574	15	....	....	....	....	....	....	....	1	1
Dannemora	3,720	38	....	....	....	....	....	....	....	....	2
Ellenburg	3,248	9	....	....	....	....	....	....	....	....	....
Mooers	3,572	51	....	1	....	....	....	1	....	1	1
Peru	2,372	24	....	....	....	2	....	....	....	....	....
Plattsburg	3,178	48	....	1	....	....	....	....	....	1	2

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Clinton county—(*continued*)											
Plattsburg	8,434	161	....	....	....	6	....	....	2	7	18
Saranac	3,463	34	....	....	....	2	....	....	....	1	.....
Schuyler Falls	1,665	18	....	1	....	....	....	....	....	....	3
Columbia county	43,211	768	3	20	....	3	1	....	2	7	37
HUDSON	9,528	227	2	17	....	....	1	....	2	3	15
Ancram	1,238	9	....	....	....	....	....	....	....	....	.....
Austerlitz	974	16	....	....	....	....	....	....	....	....	.....
Canaan	1,307	20	....	....	....	....	....	....	....	....	.....
Chatham	3,537	74	....	....	....	....	....	....	....	....	3
Claverack	4,416	66	1	....	....	2	....	....	....	1	4
Clermont	812	9	....	....	....	....	....	....	....	....	.....
Copake	1,277	24	....	1	....	....	....	....	....	2	.....
Gallatin	823	10	....	....	....	....	....	....	....	....	2
Germantown	1,686	24	....	....	....	1	....	....	....	....	1
Ghent	2,698	47	....	2	....	....	....	....	....	....	3
Greenport	1,191	18	....	....	....	....	....	....	....	....	.....
Hillsdale	1,390	31	....	....	....	....	....	....	....	....	1
Kinderhook	3,333	63	....	....	....	....	....	....	....	....	6
Livingston	1,707	24	....	....	....	....	....	....	....	....	.....
New Lebanon	1,556	24	....	....	....	....	....	....	....	....	.....
Stockport	2,719	33	....	....	....	....	....	....	....	....	1
Stuyvesant	2,125	31	....	....	....	....	....	....	....	....	.....
Taghkanick	894	18	....	....	....	....	....	....	....	1	1

Cortland county	**27,576**	**457**	....	**1**	**1**	....	**1**	....	**2**	**5**	**17**
Cincinnatus	912	22	....	....	....	....	....	....	....	....	....
Cortlandville	2,868	55	....	....	1	....	....	....	....	....	....
CORTLAND	9,014	151	....	1	....	....	1	....	2	4	13
Cuyler	991	21	....	....	....	....	....	....	....	....	1
Freetown	610	11	....	....	....	....	....	....	....	....	....
Harford	753	9	....	....	....	....	....	....	....	....	....
Homer	1,522	14	....	....	....	....	....	....	....	....	....
Homer	2,381	40	....	....	....	....	....	....	....	1	2
Lapeer	538	7	....	....	....	....	....	....	....	....	1
Marathon	1,664	25	....	....	....	....	....	....	....	....	....
Preble	857	17	....	....	....	....	....	....	....	....	....
Scott	852	11	....	....	....	....	....	....	....	....	....
Solon	622	7	....	....	....	....	....	....	....	....	....
Taylor	762	16	....	....	....	....	....	....	....	....	....
Truxton	1,217	21	....	....	....	....	....	....	....	....	....
Virgil	1,326	21	....	....	....	....	....	....	....	....	....
Willett	687	9	....	....	....	....	....	....	....	....	....
Delaware county	**46,413**	**592**	**2**	**9**	....	....	**1**	**1**	**8**	**5**	**22**
Andes	1,927	24	....	....	....	....	....	....	....	....	....
Bovina	932	10	....	....	....	....	....	....	....	....	....
Colchester	3,156	51	....	1	....	....	....	1	....	1	4
Davenport	1,620	14	....	1	....	....	....	....	....	....	....
Delhi	3,243	41	1	1	....	....	....	....	....	1	....
Deposit	1,747	28	....	....	....	....	....	....	....	....	....
Franklin	2,529	40	....	....	....	....	....	....	....	....	2
Hamden	1,378	17	....	....	....	....	....	....	....	....	1
Hancock	5,308	28	....	....	....	....	....	....	5	1	....
Harpersfield	1,221	12	....	....	....	....	1	....	1	....	1
Kortwright	1,475	27	....	....	....	....	....	....	....	....	....
Masonville	1,245	30	....	1	....	....	....	....	....	....	1
Meredith	1,508	20	....	....	....	....	....	....	....	....	2
Middletown	3,619	55	1	1	....	....	....	....	1	1	2
Roxbury	2,134	32	....	2	....	....	....	....	....	....	1
Sidney	4,023	64	....	1	....	....	....	....	1	....	3
Stamford	1,997	21	....	....	....	....	....	....	....	....	1
Tompkins	2,482	20	....	....	....	....	....	....	....	....	1
Walton	4,869	58	....	1	....	....	....	....	....	1	3

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Dutchess county	81,670	1,479	5	19	....	....	15	6	11	35	121
POUGHKEEPSIE	24,029	522	....	15	....	....	12	1	2	18	49
Amenia	2,374	31	2	....	....	....	....	....	....	....	....
Beekman	1,071	18	....	....	....	....	....	1	1	....	....
Clinton	1,370	19	....	....	....	....	....	....	....	....	....
Dover	1,959	50	....	....	....	....	....	....	....	1	1
East Fishkill	1,970	64	2	....	....	....	....	....	....	1	2
Fishkill	13,016	228	1	4	....	....	....	....	4	11	30
Hyde Park	2,806	39	....	....	....	....	....	1	....	1	4
Le Grange	1,301	23	....	....	....	....	....	....	....	....	1
Milan	950	19	....	....	....	....	....	....	....	....	....
North East	2,047	36	....	....	....	....	....	....	....	....	2
Pawling	1,921	32	....	....	....	....	....	....	1	1	3
Pine Plains	1,263	19	....	....	....	....	....	....	....	....	1
Pleasant Valley	1,483	29	....	....	....	....	2	....	....	....	2
Poughkeepsie	5,943	52	....	....	....	....	....	1	1	1	6
Red Hook	3,895	69	....	....	....	....	1	1	....	....	4
Rhinebeck	3,472	49	....	....	....	....	....	....	....	....	4
Stanford	1,624	38	....	....	....	....	....	....	1	....	1
Union Vale	945	15	....	....	....	....	....	....	....	....	1
Wappingers	1,692	21	....	....	....	....	....	....	....	....	....
Wappingers Falls	3,504	45	....	....	....	....	....	....	1	....	9
Washington	3,032	61	....	....	....	....	....	1	....	1	1

Erie county	**451,299**	**6,922**	**47**	**102**	**1**	**20**	**39**	**12**	**119**	**495**	**572**
BUFFALO	370,000	5,724	41	91	1	16	36	12	113	461	516
TONAWANDA	7,421	89	1	3	....	....	2	....	....	8	8
Alden	2,396	84	....	....	....	....	....	....	....	1	1
Amherst	4,293	44	....	1	....	....	....	....	....	2	7
Aurora	4,015	61	....	....	....	....	....	....	....	1	1
Boston	1,398	11	....	....	....	....	....	....	1	....	....
Brant	2,005	22	....	....	....	....	....	....	1	1	....
Cheektowaga	5,156	68	....	....	....	....	....	....	1	4	2
Clarence	2,948	34	....	....	....	....	....	....	....	....	2
Colden	1,260	9	....	....	....	....	....	....	....	....	....
Collins	3,753	64	1	1	....	1	....	....	....	....	5
Concord	4,086	61	....	1	....	....	....	....	....	1	2
East Hamburg	2,350	39	....	....	....	1	....	....	....	1	1
Eden	2,368	33	....	....	....	....	....	....	....	1	1
Elma	2,202	30	....	....	....	....	1	....	2	....	2
Evans	2,795	59	1	....	....	2	....	....	....	....	1
Grand Island	1,036	8	....	....	....	....	....	....	....	....	....
Hamburg	4,673	75	....	2	....	....	....	....	....	3	2
Holland	1,434	17	....	....	....	....	....	....	....	....	2
Lancaster	8,757	112	1	1	....	....	....	....	....	5	7
Marilla	1,441	19	....	....	....	....	....	....	....	....	1
Newstead	3,844	36	....	....	....	....	....	....	1	....	....
North Collins	2,362	25	....	....	....	....	....	....	....	....	2
Sardinia	1,548	30	....	1	....	....	....	....	....	1	1
Tonawanda	1,205	10	....	....	....	....	....	....	....	....	1
Wales	1,220	11	....	....	....	....	....	....	....	....	....
West Seneca	5,363	197	2	1	....	....	....	....	....	10	7
Essex county	**30,707**	**429**	**1**	**4**	....	**3**	....	....	**4**	**4**	**16**
Chesterfield	2,362	28	....	....	....	....	....	....	....	....	....
Crown Point	2,112	32	....	....	....	....	....	....	....	....	1
Elizabethtown	1,131	16	....	....	....	....	....	....	1	....	1
Essex	1,333	25	....	....	....	....	....	....	2	....	1
Jay	1,744	14	....	....	....	....	....	....	....	1	....
Keene	1,394	18	....	....	....	....	....	....	....	....	....
Lewis	1,123	16	1	....	....	....	....	....	....	....	....

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Essex county—(*continued*)											
Minerva	1,052	15	....	....	....	....	....	....	....	....	.....
Moriah	4,447	85	....	....	....	....	....	....	....	1	3
Newcomb	507	......	....	....	....	....	....	....	....	....	.....
North Elba	1,670	31	....	3	....	1	....	....	1	1	1
North Hudson	544	5	....	....	....	....	....	....	....	....	.....
St. Armand	739	19	....	....	....	....	....	....	....	....	4
Schroon	1,272	14	....	....	....	....	....	....	....	....	.....
Ticonderoga	5,048	60	....	1	....	....	....	....	....	....	5
Westport	1,727	29	....	....	....	....	....	....	....	1	.....
Willsborough	1,522	15	....	....	....	....	....	....	....	....	.....
Wilmington	634	7	....	....	....	2	....	....	....	....	.....
Franklin county	**42,853**	**780**	**9**	**5**	....	**3**	....	**2**	**8**	**19**	**89**
Altamont	3,045	94	....	. .	....	....	....	1	3	1	5
Bangor	2,221	27	....	....	....	....	....	....	....	....	.....
Belmont	2,414	21	1	....	....	....	....	....	....	....	.....
Bombay	2,742	37	1	....	....	....	....	....	....	1	3
Brandon	938	13	....	....	....	....	....	....	....	1	.....
Brighton	706	29	....	....	....	3	....	....	1	....	4
Burke	1,936	26	....	....	....	....	....	....	....	2	1
Chateaugay	2,723	32	....	....	....	....	....	....	....	1	1
Constable	1,266	29	....	....	....	....	....	....	....	....	2
Dickinson	1,691	43	....	....	....	....	....	....	....	1	2
Duane	312	3	....	....	....	....	....	....	....	....	.....
Fort Covington	2,043	28	....	....	....	....	....	....	3	....	1

Franklin	1,501	18	....	....	....	....	....	....	....	....	1
Harrietstown	1,142	12	....	2	....	....	....	....	....	....	2
Malone	5,935	120	7	1	....	....	....	....	....	2	9
Malone	4,074	49	....	1	....	....	....	....	....	1	3
Moira	2,484	35	....	1	....	....	....	....	....	1	1
Santa Clara	580	7	....	....	....	....	....	....	....	....	....
Saranac Lake	2,594	110	....	....	....	....	....	1	....	4	54
Waverly	1,615	28	....	....	....	....	....	....	1	4	....
Westville	1,237	19	....	....	....	....	....	....	....	....	....
Fulton county	**42,842**	**585**	**3**	**1**	....	**4**	**2**	**2**	**8**	**10**	**39**
GLOVERSVILLE	18,349	258	2	1	....	2	1	1	5	5	17
Bleecker	603	8	....	....	....	....	....	....	....	....	....
Broadalbin	1,946	24	....	....	....	....	....	....	....	....	3
Caroga	470	9	....	....	....	1	....	....	2	....	....
Ephratah	1,566	22	....	....	....	....	....	....	....	....	....
JOHNSTOWN	10,130	124	....	....	....	1	1	1	....	4	13
Johnstown	2,661	41	1	....	....	....	....	....	....	....	2
Mayfield	2,136	33	....	....	....	....	....	....	....	....	3
Northampton	2,226	44	....	....	....	....	....	....	1	1	1
Oppenheim	1,258	10	....	....	....	....	....	....	....	....	....
Perth	667	5	....	....	....	....	....	....	....	....	....
Stratford	830	7	....	....	....	....	....	....	....	....	....
Genesee county	**34,561**	**495**	**3**	**4**	....	**2**	....	....	**5**	**12**	**19**
Alabama	1,957	13	....	....	....	....	....	....	....	....	....
Alexander	1,503	22	....	....	....	....	....	....	....	....	2
Batavia	9,180	125	1	2	....	1	....	....	1	6	9
Batavia	2,250	34	....	....	....	....	....	....	....	2	....
Bergen	1,669	33	....	1	....	....	....	....	....	....	....
Bethany	1,512	30	....	....	....	....	....	....	1	....	2
Byron	1,330	29	....	....	....	....	....	....	....	....	1
Darien	1,887	31	....	....	....	1	....	....	1	1	2
Elba	1,526	24	....	....	....	....	....	....	....	....	....
Le Roy	3,144	55	....	....	....	....	....	....	....	1	2
Le Roy	1,679	17	....	....	....	....	....	....	....	....	1

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Genesee county—(*continued*)											
Oakfield	1,589	24	1	....	....	....	....	....	1	....	.....
Pavilion	1,542	15	....	....	....	....	....	....	....	....	.....
Pembroke	2,425	36	1	1	....	....	....	....	1	....	.....
Stafford	1,338	17	....	....	....	....	....	....	....	2	.....
Greene county	**31,478**	**523**	**4**	**11**	....	....	....	**2**	**1**	**9**	**25**
Ashland	692	9	....	....	....	....	....	....	....	....	.....
Athens	2,891	59	....	1	....	....	....	....	....	....	2
Cairo	2,176	31	....	....	....	....	....	....	....	....	2
Catskill	3,082	50	....	1	....	....	....	....	....	....	.....
Catskill	5,484	93	2	6	....	....	....	....	1	5	6
Coxsackie	4,102	63	2	2	....	....	....	....	....	2	4
Durham	1,636	25	....	....	....	....	....	....	....	....	1
Greenville	1,651	31	....	....	....	....	....	....	....	....	1
Halcott	350	5	....	....	....	....	....	....	....	....	.....
Hunter	2,788	39	....	1	....	....	....	....	....	1	4
Jewett	1,028	15	....	....	....	....	....	....	....	....	.....
Lexington	1,153	12	....	....	....	....	....	1	....	....	.....
New Baltimore	2,283	35	....	....	....	....	....	....	....	....	2
Prattsville	775	9	....	....	....	....	....	....	....	....	.....
Windham	1,387	47	....	....	....	....	....	1	....	1	3
Hamilton county	**4,947**	**53**	....	....	....	....	....	....	....	**2**	**2**
Arietta	247	4	....	....	....	....	....	....	....	....	.....
Benson	299	2	....	....	....	....	....	....	....	....	.....
Hope	463	2	....	....	....	....	....	....	....	....	.....

Indian Lake	1,219	10	....	....	....	....	....	....	....	....	.....
Inlet	....	3	....	....	....	....	....	....	....	....	.....
Lake Pleasant	469	4	....	....	....	....	....	....	....	....	.....
Long Lake	1,023	18	....	....	....	....	....	....	....	....	2
Morehouse	319	....	....	....	....	....	....	....	....	....	.....
Wells	908	10	....	....	....	....	....	....	....	2	.....
Herkimer county	**51,049**	**657**	**2**	**5**	....	**2**	**1**	**1**	**16**	**13**	**46**
Columbia	1,268	12	....	....	....	....	....	....	....	....	.....
Danube	1,043	6	....	....	....	....	....	....	....	....	.....
Fairfield	1,390	18	....	....	....	....	....	....	....	....	.....
Frankfort	4,472	68	....	....	....	1	....	....	1	3	7
German Flats	3,525	47	....	....	....	....	....	....	....	....	1
Ilion	5,138	54	....	....	....	....	....	1	2	4	2
Herkimer	5,555	68	1	1	....	....	1	....	....	2	2
Herkimer	1,193	20	....	....	....	....	....	....	....	....	1
Litchfield	931	9	....	....	....	....	....	....	....	....	.....
LITTLE FALLS	10,381	143	1	4	....	1	....	....	3	2	20
Little Falls	718	8	....	....	....	....	....	....	....	....	.....
Manheim	2,648	32	....	....	....	....	....	....	4	1	2
Newport	1,613	33	....	....	....	....	....	....	....	....	2
Norway	680	6	....	....	....	....	....	....	....	....	1
Ohio	660	11	....	....	....	....	....	....	4	....	.....
Russia	2,025	26	....	....	....	....	....	....	....	....	.....
Salisbury	1,426	14	....	....	....	....	....	....	1	....	2
Schuyler	1,365	12	....	....	....	....	....	....	1	....	.....
Stark	1,030	13	....	....	....	....	....	....	....	....	.....
Warren	1,240	18	....	....	....	....	....	....	....	....	.....
Webb	920	26	....	....	....	....	....	....	....	1	5
Wilmurt	353	2	....	....	....	....	....	....	....	....	.....
Winfield	1,475	21	....	....	....	....	....	....	....	....	1
Jefferson county	**76,748**	**1,198**	**3**	**61**	....	**2**	....	**5**	**20**	**11**	**61**
WATERTOWN	21,696	413	2	52	....	....	....	2	8	7	22
Adams	3,081	59	....	....	....	....	....	....	....	....	2
Alexandria	3,894	59	....	....	....	....	....	....	2	....	3
Antwerp	3,008	35	....	....	....	....	....	....	....	....	2

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Jefferson county—(*continued*)											
Brownville	3,698	47	....	1	....	....	....	1	1	....	1
Cape Vincent	2,882	25	....	1	....	....	....	....	1	1	4
Champion	2,525	39	....	....	....	1	....	....	....	....	2
Clayton	4,313	55	....	1	....	....	....	....	5	....	3
Ellisburg	3,888	71	....	1	....	....	....	....	....	1	7
Henderson	1,615	26	....	1	....	....	....	....	....	....	....
Hounsfield	2,772	22	1	....	....	....	....	....	....	1	....
Le Ray	2,576	37	....	1	....	....	....	....	....	....	3
Lorraine	1,019	14	....	....	....	....	....	....	....	....	1
Lyme	2,200	19	....	....	....	....	....	....	....	....	1
Orleans	2,367	39	....	....	....	....	....	1	....	....	3
Pamelia	1,031	30	....	....	....	....	....	....	1	....	....
Philadelphia	1,750	13	....	....	....	....	....	....	....	....	....
Rodman	1,212	19	....	....	....	....	....	....	....	....	....
Rutland	1,885	35	....	....	....	....	....	....	....	....	3
Theresa	2,130	39	....	....	....	....	....	....	....	1	1
Watertown	1,159	16	....	....	....	....	....	....	....	....	....
Wilna	5,172	75	....	2	....	1	....	1	2	....	3
Worth	875	11	....	1	....	....	....	....	....	....	....
Kings county*	....	......	....	....	....	....	....	....	....	....	....
Lewis county	**27,427**	**384**	**3**	**1**	....	....	....	**2**	**2**	**3**	**13**
Croghan	3,159	25	1	....	....	....	....	....	1	....	....
Denmark	2,193	26	....	....	....	....	....	....	....	....	1
Diana	2,083	23	....	....	....	....	....	....	....	....	....

* See the city of New York.

Greig	1,100	15									1
Harrisburg	770	8									
High Market	593	10									
Lewis	917	22									
Leyden	1,629	26	1								
Lowville	3,746	75		1					1	1	5
Lyonsdale	1,371	17						1		1	
Martinsburg	1,845	33	1					1			1
Montague	766	6									
New Bremen	1,775	22								1	2
Osceola	629	3									
Pinckney	934	11									
Turin	1,157	16									1
Watson	981	13									
West Turin	1,779	33									2
Livingston county	**37,059**	**518**		**6**			**1**	**2**	**6**	**5**	**26**
Avon	3,071	36		1							3
Caledonia	2,072	27									1
Conesus	1,149	14									
Geneseo	3,613	54		1					2		5
Groveland	1,949	51									2
Leicester	1,415	20									
Lima	2,279	24						1			
Livonia	2,788	41		1							5
Mt. Morris	3,715	56								2	2
North Dansville	328	2									
Dansville	3,633	56		1			1		1	1	2
Nunda	2,397	44									1
Ossian	780	6									
Portage	1,029	15									1
Sparta	1,189	20						1	1		
Springwater	2,016	13									
West Sparta	906	12									
York	2,730	37		2					2	2	4

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Madison county	42,096	....	1	8	....	....	....	....	....	12	25
Brookfield	2,726	32	....	....	....	....	....	....	....	2	2
Cazenovia	3,830	68	1	1	....	....	....	....	....	....	5
De Ruyter	1,410	21	....	....	....	....	....	....	....	....	1
Eaton	2,705	65	....	....	....	....	....	....	....	....	....
Fenner	911	12	....	....	....	....	....	....	....	....	....
Georgetown	998	14	....	....	....	....	....	....	....	....	....
Hamilton	3,741	64	....	....	....	....	....	....	....	4	....
Lebanon	1,243	15	....	....	....	....	....	....	....	1	1
Lenox	4,679	22	....	1	....	....	....	....	....	....	....
Lincoln	1,052	13	....	....	....	....	....	....	....	....	1
ONEIDA	7,942	112	....	3	....	....	....	....	....	4	9
Oneida	1,174	3	....	....	....	....	....	....	....	....	1
Madison	2,024	35	....	....	....	....	....	....	....	1	....
Nelson	1,296	22	....	....	....	....	....	....	....	....	1
Smithfield	989	11	....	....	....	....	....	....	....	....	....
Stockbridge	1,622	18	....	....	....	....	....	....	....	....	1
Sullivan	3,778	58	....	3	....	....	....	....	....	....	3
Monroe county	217,854	3,512	8	35	3	38	1	2	103	99	301
ROCHESTER	162,608	2,672	6	27	3	35	1	1	93	78	257
Brighton	3,815	38	....	....	....	....	....	....	1	....	2
Chili	2,099	25	1	....	....	....	....	....	....	....	....
Clarkson	1,581	44	....	....	....	....	....	....	....	1	2
Gates	3,468	47	....	....	....	....	....	....	....	1	2
Greece	5,579	129	....	1	....	1	....	....	2	16	11
Hamlin	2,188	39	....	1	....	....	....	....	....	....	2

Henrietta	2,062	19	....	....	....	2	....	....	....	....	.....
Irondequoit	2,863	47	....	....	....	....	....	....	1	1	1
Mendon	2,760	47	....	1	....	....	....	....	....	....	4
Ogden	2,616	42	....	....	....	....	....	....	....	1	.....
Parma	2,814	29	....	2	....	....	....	....	....	1	2
Penfield	2,857	32	1	....	....	....	....	....	....	....	1
Perinton	4,703	64	....	....	....	....	....	....	....	....	6
Pittsford	2,373	34	....	....	....	....	....	....	....	....	2
Riga	1,864	26	....	....	....	....	....	....	....	....	1
Rush	1,491	20	....	....	....	....	....	....	1	....	.....
Sweden	1,345	21	....	....	....	....	....	....	....	....	3
Brockport	3,398	54	....	3	....	....	....	....	3	....	3
Webster	3,289	51	....	....	....	....	....	1	2	....	2
Wheatland	2,071	32	....	....	....	....	....	....	....	....	.....
Montgomery county	**47,488**	**720**	**2**	**9**	....	**2**	**2**	**3**	**7**	**27**	**55**
AMSTERDAM	20,929	357	2	4	....	2	2	1	2	26	36
Amsterdam	3,202	31	....	1	....	....	....	....	2	....	1
Canajoharie	3,888	59	....	3	....	....	....	....	....	....	7
Charlestown	1,052	17	....	....	....	....	....	....	....	....	.....
Florida	1,988	15	....	....	....	....	....	....	....	....	1
Glen	2,281	26	....	....	....	....	....	....	1	....	1
Minden	2,097	25	....	1	....	....	....	....	....	....	.....
Fort Plain	2,444	44	....	....	....	....	....	1	1	....	2
Mohawk	2,711	33	....	....	....	....	....	....	....	....	.....
Palatine	2,569	43	....	....	....	....	....	....	....	1	4
Root	1,653	24	....	....	....	....	....	1	....	....	1
St. Johnsville	2,674	46	....	....	....	....	....	....	1	....	2
Nassau county	**55,448**	**938**	**2**	**10**	**2**	**1**	**11**	**10**	**19**	**61**	**76**
Hempstead	27,066	436	....	5	2	1	6	8	13	21	34
North Hempstead	12,048	236	....	5	....	....	....	....	3	20	19
Oyster Bay	16,334	266	2	....	....	....	5	2	3	20	23
New York, City of	**3,437,202**	**72,043**	**1,389**	**659**	**102**	**852**	**880**	**198**	**2,093**	**5,936**	**8,516**
Borough of Manhattan	1,850,093	42,327	1,000	277	28	358	430	109	1,125	3,121	4,121
Borough of Bronx	200,507	6,417	75	32	19	176	113	12	150	298	1,396
Borough of Brooklyn	1,166,582	24,831	278	303	42	282	333	69	706	2,129	2,634

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
New York, City of—(*continued*)											
Borough of Queens	152,999	3,015	26	32	10	20	1	6	77	259	260
Borough of Richmond	67,021	1,453	10	15	3	16	3	2	35	129	105
Niagara county	**74,961**	**1,263**	**7**	**46**	**1**	**1**	**4**	**9**	**34**	**61**	**74**
LOCKPORT	16,581	287	....	6	1	....	....	....	17	7	28
NIAGARA FALLS	19,457	411	4	34	....	....	4	7	12	40	23
Cambria	1,880	28	....	....	....	....	....	....	....	....	.....
Hartland	2,728	39	....	....	....	....	....	....	....	....	.....
Lewiston	3,221	38	....	....	....	....	....	....	....	....	2
Lockport	2,585	47	....	....	....	....	....	....	....	2	1
Newfane	3,248	44	....	....	....	....	....	....	....	2	3
Niagara	1,066	26	....	1	....	....	....	....	....	3	1
Pendleton	1,364	15	....	....	....	....	....	....	....	1	1
Porter	2,235	30	....	1	....	....	....	....	....	....	.....
Royalton	4,797	70	....	....	....	....	....	....	2	1	2
Somerset	1,923	35	....	....	....	....	....	....	....	....	.....
Wheatfield	1,926	23	....	....	....	....	....	....	1	....	2
NORTH TONAWANDA	9,069	128	3	3	....	1	....	2	2	5	11
Wilson	2,881	42	....	1	....	....	....	....	....	....	.....
Oneida county	**132,800**	**2,402**	**7**	**22**	....	**57**	**9**	**16**	**32**	**58**	**183**
UTICA	56,383	1,201	2	11	....	50	7	8	21	44	98
ROME	15,243	289	4	4	....	3	1	....	1	6	43
Annsville	1,744	30	....	....	....	....	....	....	1	....	.....
Augusta	2,029	25	....	....	....	....	....	....	....	....	.....

Ava	706	9	....	....	....	....	....	....	....	....	.....
Boonville	3,332	64	....	1	....	....	....	1	....	....	5
Bridgewater	931	11	....	....	....	....	....	....	....	....	.....
Camden	3,745	57	....	1	....	1	....	....	1	....	5
Deerfield	1,756	27	....	....	....	....	....	....	....	....	1
Florence	1,207	10	....	....	....	....	....	....	....	....	.....
Floyd	785	12	....	....	....	....	....	....	....	....	1
Forestport	1,562	34	....	....	....	....	....	....	....	1	1
Kirkland	4,545	57	....	1	....	....	....	....	....	....	5
Lee	1,571	24	....	....	....	....	....	....	....	....	1
Marcy	1,398	25	....	....	....	....	....	....	....	....	1
Marshall	1,566	34	....	....	....	....	....	....	2	....	2
New Hartford	5,230	65	....	....	....	1	....	4	....	....	1
Paris	2,626	39	....	1	....	....	....	1	....	....	1
Remsen	1,208	26	....	....	....	....	....	....	1	....	1
Rome	....	4	....	....	....	....	....	....	....	....	1
Sangerfield	1,107	43	....	1	....	....	....	....	....	....	4
Steuben	902	12	....	....	....	....	....	....	....	....	.....
Trenton	2,628	36	1	....	....	....	....	....	....	....	1
Vernon	2,784	36	....	....	....	....	....	....	1	....	.....
Verona	3,875	51	....	....	....	....	....	....	....	1	1
Vienna	2,218	36	....	....	....	....	....	....	1	....	2
Waterville	1,571	......	....	....	....	....	....	....	....	....	.....
Western	1,621	18	....	....	....	1	....	....	....	....	1
Westmoreland	2,192	35	....	1	....	....	....	....	1	....	2
Whitestown	6,235	91	....	1	....	1	1	2	1	6	5
Onondaga county	**168,735**	**2,665**	**14**	**28**	....	**35**	**4**	**1**	**27**	**56**	**220**
SYRACUSE	108,374	1,752	9	17	....	31	4	1	22	50	172
Camillus	2,543	41	....	1	....	....	....	....	....	....	.....
Cicero	2,611	25	1	1	....	....	....	....	....	....	1
Clay	2,578	33	....	1	....	....	....	....	....	....	.....
De Witt	5,435	82	3	3	....	....	....	....	2	1	8
Elbridge	3,327	64	....	....	....	....	....	....	....	....	1
Fabius	1,686	23	....	....	....	....	....	....	....	1	2
Geddes	4,387	48	1	....	....	....	....	....	....	1	2
La Fayette	1,892	32	....	....	....	....	....	....	....	....	.....

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Onondaga county—(*continued*)											
Lysander	3,026	30	....	....	....	....	....	....	....	....	....
Baldwinsville	2,992	45	....	2	....	....	....	....	....	....	4
Manlius	5,374	95	....	....	....	....	....	....	....	....	5
Marcellus	2,581	37	....	1	....	....	....	....	....	....	....
Onondaga	5,580	141	....	1	....	....	....	....	....	....	16
Otisco	1,202	19	....	....	....	....	....	....	....	....	1
Pompey	2,546	33	....	1	....	....	....	....	....	....	2
Salina	3,745	45	....	....	....	4	....	....	3	2	2
Skaneateles	4,205	67	....	....	....	....	....	....	....	....	1
Spafford	1,159	9	....	....	....	....	....	....	....	....	....
Tully	1,465	18	....	....	....	....	....	....	....	....	2
Van Buren	2,117	26	....	....	....	....	....	....	....	1	1
Ontario county	**49,605**	**765**	**2**	**7**	**1**	....	**1**	**2**	**7**	**26**	**46**
Bristol	1,310	18	....	....	....	....	....	....	....	....	....
Canadice	674	8	....	....	....	....	....	....	....	....	....
Canandaigua	2,133	43	....	....	....	....	....	1	....	2	1
Canandaigua	6,151	130	1	1	....	....	....	1	1	7	10
East Bloomfield	1,940	26	....	....	....	....	....	....	....	....	....
Farmington	1,607	22	....	....	....	....	....	....	....	....	....
Geneva	1,091	15	....	....	....	....	....	....	....	....	....
GENEVA	10,433	187	1	5	1	....	....	....	5	9	17
Gorham	2,131	23	....	....	....	....	....	....	....	..	1
Hopewell	1,550	43	....	....	....	....	....	....	....	1	5
Manchester	4,733	64	....	....	....	....	....	....	....	1	4
Naples	2,370	30	....	....	....	....	....	....	....	....	2

Phelps	4,788	62	....	....	....	....	....	....	....	2	5
Richmond	1,381	17	....	....	....	....	....	....	....	1	1
Seneca	2,654	32	....	....	....	....	....	....	....	....	.....
South Bristol	1,104	8	....	1	....	....	....	....	....	1	.....
Victor	2,249	20	....	....	....	....	....	....	....	1	.....
West Bloomfield	1,306	17	....	....	....	....	1	....	1	1	.....
Orange county	**103,859**	**1,786**	**13**	**26**	....	**2**	**21**	**12**	**52**	**65**	**171**
NEWBURGH	24,943	524	8	11	....	....	11	5	18	17	62
MIDDLETOWN	14,522	263	1	1	....	....	3	....	4	6	28
Blooming Grove	2,188	32	....	....	....	....	....	....	2	1	1
Chester	2,186	32	....	1	....	....	....	....	1	2	2
Cornwall	4,258	67	....	....	....	....	1	....	....	2	3
Crawford	1,778	30	....	....	....	....	....	....	....	....	2
Deerpark	1,932	37	....	....	....	....	....	....	1	....	3
Port Jervis	9,385	193	2	7	....	....	4	....	12	7	17
Goshen	4,564	95	1	....	....	....	....	....	2	4	9
Greenville	800	11	....	....	....	....	....	....	....	....	2
Hamptonburg	1,072	14	....	....	....	1	....	....	1	....	.....
Highlands	4,519	61	....	1	....	....	....	....	1	5	4
Minisink	1,505	13	....	....	....	....	....	....	....	....	.....
Monroe	1,784	33	....	....	....	....	....	....	2	....	6
Montgomery	5,939	122	1	2	....	1	1	5	6	8	10
Mount Hope	1,236	14	....	....	....	....	....	....	....	....	3
Newburgh	4,246	49	....	1	....	....	1	....	1	3	6
New Windsor	2,392	34	....	2	....	....	....	....	....	3	1
Tuxedo	2,277	25	....	....	....	....	....	....	....	1	2
Walkill	2,725	27	....	....	....	....	....	....	....	1	.....
Warwick	6,403	74	....	....	....	....	....	2	1	4	7
Wawayanda	1,539	11	....	....	....	....	....	....	....	....	.....
Woodbury	1,666	25	....	....	....	....	....	....	....	1	3
Orleans county	**30,164**	**430**	....	**1**	....	....	....	....	**3**	**6**	**25**
Albion	4,447	71	....	....	....	....	....	....	....	4	3
Albion	1,398	29	....	....	....	....	....	....	....	....	.....
Barre	1,937	29	....	....	....	....	....	....	....	1	1
Carlton	2,338	12	....	....	....	....	....	....	....	....	1

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Orleans county—(*continued*)											
Clarendon	1,518	17	....	....	....	....	....	....	1	....	.....
Gaines	1,763	31	....	....	....	....	....	....	....	....	2
Kendall	1,616	19	....	....	....	....	....	....	....	....	.....
Murray	3,656	80	....	1	....	....	....	....	....	....	6
Ridgeway	2,753	37	....	....	....	....	....	....	1	....	2
Medina	4,716	71	....	....	....	....	....	....	1	1	8
Shelby	2,108	19	....	....	....	....	....	....	....	....	2
Yates	1,884	15	....	....	....	....	....	....	....	....	....
Oswego county	**70,881**	**1,125**	**3**	**18**	....	**2**	....	**1**	**14**	**20**	**75**
OSWEGO	22,199	391	2	14	....	1	....	1	10	13	33
Albion	1,724	22	....	....	....	....	....	....	....	....	1
Amboy	824	8	....	....	....	....	....	....	....	....	1
Boylston	849	14	....	....	....	....	....	....	....	....	1
Constantia	2,259	44	....	....	....	....	....	....	....	....	.....
Granby	5,120	20	....	....	....	....	....	....	....	....	2
Hannibal	2,473	35	....	....	....	....	....	....	....	....	1
Hastings	2,303	48	1	....	....	....	....	....	1	....	1
Mexico	3,091	78	....	....	....	....	....	....	....	1	4
New Haven	1,408	22	....	....	....	....	....	....	....	....	1
Orwell	1,149	7	....	....	....	....	....	....	....	....	.....
Oswego	2,737	32	....	....	....	....	....	....	....	....	2
Palermo	1,407	29	....	....	....	....	....	....	....	....	1
Parish	1,530	16	....	....	....	....	....	....	....	....	3
Redfield	911	15	....	....	....	....	....	....	....	....	2
Richland	3,535	58	....	....	....	1	....	....	1	....	2

Sandy Creek	2,232	48	....	....	....	....	....	....	....	....	2
Schroeppel	3,012	34	....	....	....	....	....	....	....	....	2
Scriba	2,480	31	....	....	....	....	....	....	1	....	.....
Volney	2,393	24	....	....	....	....	....	....	....	....	3
Fulton	5,281	123	....	3	....	....	....	....	1	6	13
West Monroe	936	11	....	....	....	....	....	....	....	....	.....
Williamstown	1,028	15	....	1	....	....	....	....	....	....	.....
Otsego county	**48,939**	**833**	**1**	**9**	....	....	**3**	**3**	**3**	**12**	**33**
Burlington	1,263	22	....	....	....	....	....	....	....	....	2
Butternuts	1,698	24	....	1	....	....	....	1	....	....	1
Cherry Valley	1,802	24	....	....	....	....	....	....	....	....	2
Decatur	559	3	....	....	....	....	....	....	....	....	.....
Edmeston	1,767	18	....	....	....	....	....	....	....	....	.....
Exeter	1,087	24	....	....	....	....	....	....	....	1	3
Hartwick	1,800	20	....	....	....	....	....	....	....	....	1
Laurens	1,483	24	....	....	....	....	....	....	....	....	2
Maryland	1,998	45	....	....	....	....	....	....	....	1	1
Middlefield	2,058	45	....	....	....	....	....	....	....	1	.....
Milford	2,007	30	....	....	....	....	....	....	1	....	1
Morris	1,689	33	....	....	....	....	....	....	....	....	2
New Lisbon	1,255	22	....	....	....	....	....	....	....	....	1
Oneonta	1,763	23	....	....	....	....	....	....	....	....	1
Oneonta	7,147	139	....	4	....	....	3	....	1	4	7
Otego	1,817	32	....	....	....	....	....	....	....	....	1
Otsego	1,171	31	....	1	....	....	....	....	....	....	.....
Cooperstown	2,368	49	....	....	....	....	....	....	....	2	4
Pittsfield	1,101	10	....	....	....	....	....	....	....	....	1
Plainfield	897	17	....	1	....	....	....	....	....	1	.....
Richfield	2,526	39	1	....	....	....	....	....	....	....	2
Roseboom	1,031	15	....	....	....	....	....	....	....	....	.....
Springfield	1,762	25	....	....	....	....	....	....	....	1	.....
Unadilla	2,601	53	....	2	....	....	....	....	....	1	.....
Westford	910	22	....	....	....	....	....	1	....	....	1
Worcester	2,409	44	....	....	....	....	....	1	1	....	....

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Putnam county	**13,787**	**243**	....	....	....	....	....	....	**3**	**2**	**14**
Carmel	2,598	40	....	....	....	....	....	....	....	....	3
Kent	1,026	22	....	....	....	....	....	....	....	....	3
Patterson	1,644	28	....	....	....	....	....	....	....	....	3
Phillipstown	4,642	93	....	....	....	....	....	....	3	....	4
Putnam Valley	1,034	21	....	....	....	....	....	....	....	2	1
South East	2,843	39	....	....	....	....	....	....	....	....	.....
Rensselaer county	**121,697**	**2,285**	**7**	**46**	....	**5**	**10**	**5**	**17**	**85**	**259**
TROY	60,651	1,573	5	34	....	2	10	5	14	72	210
Berlin	1,677	21	....	....	....	....	....	....	....	....	.....
Brunswick	3,513	47	....	....	....	1	....	....	....	....	3
East Greenbush	2,036	10	....	....	....	....	....	....	....	....	1
Grafton	1,136	25	....	....	....	....	....	....	....	1	1
RENSSELAER	7,466	168	2	9	....	2	....	....	3	1	16
Hoosick	2,960	18	....	....	....	....	....	....	....	....	1
Hoosick Falls	5,671	89	....	1	....	....	....	....	....	3	14
Nassau	2,073	45	....	1	....	....	....	....	....	1	2
North Greenbush	4,719	17	....	....	....	....	....	....	....	....	1
Petersburg	1,449	22	....	....	....	....	....	....	....	1	.....
Pittstown	3,236	46	....	1	....	....	....	....	....	2	1
Poestenkill	1,342	23	....	....	....	....	....	....	....	2	1
Sand Lake	2,299	36	....	....	....	....	....	....	....	....	1
Schaghticoke	2,631	51	....	....	....	....	....	....	....	....	3
Schodack	4,334	74	....	....	....	....	....	....	....	2	3
Stephentown	1,545	20	....	....	....	....	....	....	....	....	1

Richmond county*	....	....	....	....	....	....	....	....	....	....	....
Rockland county	38,298	630	....	6	3	....	8	3	12	30	41
Clarkstown	6,305	69	....	....	....	....	....	....	1	....	2
Haverstraw	9,874	116	....	3	1	....	4	....	2	10	5
Orangetown	6,181	112	....	....	1	....	2	....	2	4	5
Nyack	4,275	84	....	2	....	....	1	....	3	2	5
Ramapo	7,502	189	....	....	1	....	....	3	2	11	22
Stony Point	4,161	60	....	1	....	....	1	....	2	3	2
St. Lawrence county	89,083	1,166	2	25	....	3	1	7	6	24	78
OGDENSBURG	12,633	238	....	9	....	....	....	1	3	10	19
Brasher	2,703	24	....	1	....	....	1	1	....	1	4
Canton	6,387	97	1	3	....	....	....	....	....	3	5
Clare	330	3	....	....	....	....	....	....	....	....	....
Clifton	1,382	13	....	1	....	....	....	....	....	....	1
Colton	1,678	25	....	....	....	....	....	....	....	....	2
De Kalb	2,723	28	....	....	....	....	....	1	....	....	....
De Peyster	936	12	....	....	....	....	....	....	....	....	2
Edwards	1,340	20	....	....	....	....	....	....	....	....	....
Fine	1,694	29	....	....	....	1	....	....	1	....	....
Fowler	1,716	15	....	....	....	....	....	....	....	....	1
Gouverneur	5,915	85	1	3	....	....	....	....	....	2	5
Hammond	1,764	28	....	....	....	....	....	....	....	....	3
Hermon	1,542	27	....	....	....	....	....	....	....	....	1
Hopkinton	2,521	19	....	....	....	....	....	....	....	1	....
Lawrence	1,963	27	....	....	....	2	....	....	....	1	....
Lisbon	5,255	35	....	....	....	....	....	....	....	1	1
Louisville	1,621	18	....	....	....	....	....	....	....	....	....
Macomb	1,374	14	....	....	....	....	....	....	....	....	3
Madrid	1,668	17	....	1	....	....	....	....	....	1	....
Massena	3,904	27	....	....	....	....	....	....	....	1	2
Morristown	1,798	29	....	....	....	....	....	....	....	....	1
Norfolk	1,911	36	....	....	....	....	....	1	....	1	5
Oswegatchie	2,368	33	....	3	....	....	....	....	....	....	1
Parishville	2,086	28	....	....	....	....	....	....	....	....	....

*See the city of New York.

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
St. Lawrence county—(*continued*)											
Piercefield	....	6	....	....	....	....	....	....	....	....	....
Pierrepont	1,885	19	....	....	....	....	....	....	....	1	1
Pitcairn	902	14	....	....	....	....	....	1	....	....	1
Potsdam	5,211	47	....	....	....	....	....	....	....	....	8
Potsdam	3,843	49	....	1	....	....	....	1	1	....	7
Rossie	1,136	12	....	....	....	....	....	....	....	....	1
Russell	2,067	33	....	1	....	....	....	....	....	....	....
Stockholm	2,826	38	....	1	....	....	....	....	1	....	4
Waddington	2,001	19	....	1	....	....	....	1	....	1	....
Saratoga county	61,089	1,017	6	15	....	1	....	....	8	24	65
Ballston Spa	3,923	73	1	1	....	....	....	....	....	2	5
Ballston	1,501	25	....	....	....	....	....	....	....	1	....
Charlton	1,109	16	....	....	....	....	....	....	....	....	1
Clifton Park	2,140	33	....	....	....	....	....	....	....	....	....
Corinth	3,104	35	....	....	....	....	....	....	....	1	....
Day	719	8	....	1	....	....	....	....	....	....	....
Edinburg	1,032	18	....	....	....	....	....	....	....	....	....
Galway	1,350	22	....	1	....	....	....	....	....	....	....
Greenfield	1,837	28	....	1	....	....	....	....	....	....	2
Hadley	914	10	....	....	....	....	....	....	....	....	1
Halfmoon	1,906	30	....	1	....	....	....	....	....	....	....
Malta	1,322	27	....	1	....	....	....	....	....	....	....
Mechanicville	4,695	96	2	1	....	....	....	....	4	9	5
Milton	2,536	45	1	....	....	....	....	....	....	....	2

Moreau	2,999	41	1	....	....	....	....	....	....	....	4
Northumberland	1,227	24	....	....	....	....	....	....	....	....	.....
Providence	607	11	....	....	....	....	....	....	....	....	.....
Saratoga	3,999	54	....	....	....	....	....	....	....	2	4
Saratoga Springs	1,125	10	....	....	....	....	....	....	....	....	1
Saratoga Springs	12,409	275	1	5	....	....	....	....	4	6	26
Stillwater	3,489	37	....	....	....	....	....	....	....	1	2
Waterford	6,157	88	....	2	....	1	....	....	....	2	12
Wilton	989	11	....	1	....	....	....	....	....	....	.....
Schenectady county	62,795	969	11	13	....	3	1	10	21	95	72
SCHENECTADY	47,625	794	11	12	....	3	1	10	18	90	66
Duanesburg	2,428	32	....	....	....	....	....	....	1	1	1
Glenville	3,010	64	....	1	....	....	....	....	....	2	1
Niskayuna	1,327	16	....	....	....	....	....	....	....	....	1
Princetown	694	9	....	....	....	....	....	....	....	....	.....
Rotterdam	7,711	54	....	....	....	....	....	....	2	2	3
Schoharie county	26,854	426	1	4	....	1	....	1	5	1	19
Blenheim	768	11	....	1	....	....	....	....	....	....	1
Broome	1,153	31	....	....	....	....	....	....	....	....	1
Carlisle	1,225	13	....	....	....	....	....	....	....	....	.....
Cobleskill	3,973	51	....	1	....	....	....	....	1	....	6
Conesville	793	11	....	....	....	....	....	....	1	....	.....
Esperance	1,096	15	....	....	....	....	....	....	....	1	.....
Fulton	1,998	27	....	1	....	....	....	....	....	....	1
Gilboa	1,448	32	....	....	....	1	....	....	....	....	2
Jefferson	1,409	22	....	....	....	....	....	....	....	....	1
Middleburg	2,738	49	1	....	....	....	....	....	3	....	3
Richmondville	1,719	30	....	1	....	....	....	....	....	....	.....
Schoharie	2,900	27	....	....	....	....	....	....	....	....	2
Seward	1,404	31	....	....	....	....	....	....	....	....	1
Sharon	2,058	33	....	....	....	....	....	....	....	....	.....
Summit	1,217	21	....	....	....	....	....	1	....	....	.....
Wright	1,155	22	....	....	....	....	....	....	....	....	1

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Schuyler county	15,811	222	....	1	....	....	....	....	2	3	10
Catherine	1,386	21	....	....	....	....	....	....	....	....	1
Cayuta	459	16	....	....	....	....	....	....	....	1	.....
Dix	3,894	48	....	....	....	....	....	....	....	2	1
Hector	4,137	55	....	1	....	....	....	....	....	....	5
Montour	1,623	28	....	....	....	....	....	....	1	....	1
Orange	1,391	19	....	....	....	....	....	....	1	....	1
Reading	1,335	22	....	....	....	....	....	....	....	....	1
Tyrone	1,586	13	....	....	....	....	....	....	....	....	.....
Seneca county	28,114	418	....	4	....	....	....	....	1	6	27
Covert	1,897	24	....	....	....	....	....	....	....	....	1
Fayette	2,056	45	....	....	....	....	....	....	1	....	1
Lodi	1,636	24	....	....	....	....	....	....	....	....	.....
Ovid	3,734	45	....	....	....	....	....	....	....	1	2
Romulus	2,895	43	....	1	....	....	....	....	....	....	5
Seneca Falls	786	15	....	....	....	....	....	....	....	....	3
Seneca Falls	6,519	92	....	1	....	....	....	....	....	4	11
Tyre	954	14	....	....	....	....	....	....	....	....	.....
Varick	1,270	20	....	....	....	....	....	....	....	....	.....
Waterloo	1,058	21	....	1	....	....	....	....	....	....	.....
Waterloo	4,256	72	....	1	....	....	....	....	....	1	4
Steuben county	82,822	1,179	2	28	....	3	10	2	31	18	53
CORNING	11,061	200	1	6	....	1	....	1	10	10	15
HORNELLSVILLE	11,918	204	....	1	....	1	7	....	10	6	16
Addison	2,637	48	....	1	....	....	....	....	....	....	.....

Avoca	2,125	28	....	1	....	....	....	....	....	....	1
Bath	3,443	61	....	....	....	....	....	....	....	1	3
Bath	4,494	54	....	2	....	....	....	....	....	....	3
Bradford	771	7	....	....	....	....	....	....	....	....	....
Cameron	1,353	19	....	1	....	....	....	....	....	....	2
Campbell	1,467	21	....	....	....	....	....	....	....	....	1
Canisteo	3,432	40	....	....	....	....	....	....	1	....	3
Caton	1,345	15	....	....	....	....	....	....	....	....	....
Cohocton	3,197	22	....	2	....	....	....	....	....	....	2
Corning	1,937	20	....	....	....	....	....	....	1	....	....
Dansville	1,417	15	....	....	....	1	....	....	....	....	....
Erwin	1,851	27	....	....	....	....	....	....	2	....	....
Fremont	1,033	19	....	....	....	....	....	....	....	....	....
Greenwood	1,129	18	....	....	....	....	....	....	....	....	....
Hartsville	787	17	....	....	....	....	....	....	....	....	....
Hornby	959	16	....	....	....	....	....	....	....	....	....
Hornellsville	1,833	26	....	1	....	....	1	....	1	....	....
Howard	1,704	20	....	....	....	....	....	....	....	....	....
Jasper	1,430	15	....	....	....	....	....	1	....	....	....
Lindley	1,306	22	....	....	....	....	....	....	5	....	1
Prattsburg	2,197	22	....	....	....	....	....	....	....	....	....
Pultney	1,590	18	....	....	....	....	....	....	....	....	....
Rathbone	1,059	11	....	....	....	....	....	....	....	....	1
Thurston	1,017	10	....	....	....	....	....	....	....	....	....
Troupsburg	2,015	25	....	1	....	....	....	....	....	....	1
Tuscarora	1,301	11	....	....	....	....	....	....	....	....	1
Urbana	2,692	54	....	....	....	....	....	....	....	....	1
Wayland	2,984	38	....	....	....	....	....	....	1	1	1
Wayne	838	9	....	....	....	....	1	....	....	....	....
West Union	1,025	14	....	1	....	....	....	....	....	....	1
Wheeler	1,188	16	1	....	....	....	....	....	....	....	....
Woodhull	1,787	17	....	1	....	....	1	....	....	....	....
Suffolk county	77,582	1,139	3	12	....	2	1	4	6	39	59
Babylon	7,112	192	....	....	....	1	....	....	1	4	12
Brookhaven	14,592	260	....	6	....	....	1	2	2	7	15
East Hampton	2,724	36	....	....	....	....	....	....	....	....	1
Huntington	9,483	125	....	1	....	....	....	....	....	13	5

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Suffolk county—(*continued*)											
Islip	12,545	142	1	....	....	1	....	....	....	5	4
Riverhead	4,503	68	1	2	....	....	....	....	1	2	.....
Shelter Island	1,066	13	....	....	....	....	....	....	....	....	.....
Smithtown	5,863	38	....	....	....	....	....	....	....	....	3
Southampton	9,424	127	....	1	....	....	....	....	2	3	6
Sag Harbor	1,969	39	....	....	....	....	....	1	....	2	6
Southold	8,301	101	1	2	....	....	....	1	....	3	7
Sullivan county	**32,306**	**624**	**1**	**2**	**1**	....	....	**3**	**6**	**10**	**130**
Bethel	2,248	32	....	....	....	....	....	....	....	....	1
Callicoon	2,054	35	1	....	....	....	....	....	1	....	2
Cochecton	1,117	16	....	....	....	....	....	....	....	....	.....
Delaware	1,541	22	....	....	....	....	....	....	....	....	1
Fallsburg	2,974	59	....	....	....	....	....	1	1	1	5
Forestburg	625	7	....	....	....	....	....	....	....	....	1
Fremont	2,184	30	....	....	....	....	....	1	....	....	1
Highland	964	21	....	....	....	....	....	....	....	1	1
Liberty	4,568	167	....	....	1	....	....	1	....	4	94
Lumberland	809	11	....	....	....	....	....	....	1	....	.....
Mamakating	3,128	63	....	....	....	....	....	....	1	2	7
Neversink	2,039	26	....	1	....	....	....	....	....	....	2
Rockland	3,426	46	....	....	....	....	....	....	2	1	7
Thompson	3,739	72	....	....	....	....	....	....	....	....	7
Tusten	890	17	....	1	....	....	....	....	....	1	1

Tioga county	**27,951**	**438**	**2**	**3**	....	**2**	**2**	**2**	**2**	**6**	**19**
Waverly	4,465	67	1	1	....	....	2	1	....	2	2
Barton	1,916	39	....	1	....	....	....	1	....	....	....
Berkshire	1,011	15	1	....	....	....	....	....	....	....	1
Candor	3,330	52	....	....	....	2	....	....	....	1	1
Newark Valley	2,164	39	....	....	....	....	....	....	....	....	2
Nichols	1,564	19	....	....	....	....	....	....	....	....	1
Owego	3,339	32	....	....	....	....	....	....	....	....	2
Owego	5,039	92	....	1	....	....	....	....	2	1	7
Richford	1,142	12	....	....	....	....	....	....	....	....	....
Spencer	1,868	33	....	....	....	....	....	....	....	1	3
Tioga	2,113	33	....	....	....	....	....	....	....	1	....
Tompkins county	**33,830**	**531**	**1**	**7**	....	**1**	**4**	....	**2**	**8**	**27**
ITHACA	13,136	228	....	4	....	1	4	....	2	7	14
Caroline	1,938	38	1	....	....	....	....	....	....	....	....
Danby	1,449	17	....	....	....	....	....	....	....	....	2
Dryden	3,785	52	....	1	....	....	....	....	....	....	2
Enfield	1,214	13	....	....	....	....	....	....	....	....	....
Groton	3,564	38	....	....	....	....	....	....	....	....	2
Ithaca	1,516	19	....	....	....	....	....	....	....	1	1
Lansing	2,550	45	....	2	....	....	....	....	....	....	4
Newfield	1,902	29	....	....	....	....	....	....	....	....	1
Ulysses	2,776	52	....	....	....	....	....	....	....	....	1
Ulster county	**88,422**	**1,363**	**3**	**23**	**6**	**1**	**15**	**9**	**21**	**46**	**119**
KINGSTON	24,535	452	1	3	3	1	....	7	9	20	49
Denning	783	7	....	....	....	....	....	....	....	....	....
Esopus	4,907	84	....	3	2	....	2	....	2	3	3
Gardiner	1,509	17	....	....	....	....	....	....	....	1	....
Hardenburg	722	7	....	....	....	....	....	....	....	....	....
Hurley	1,903	26	....	....	....	....	....	....	....	....	1
Kingston	524	7	....	....	....	....	....	....	....	1	....
Lloyd	2,608	38	....	....	....	....	....	....	....	2	1
Marbletown	3,511	35	....	....	....	....	4	....	....	3	5
Marlborough	3,978	55	....	....	....	....	....	....	....	2	3
New Paltz	2,264	47	....	1	....	....	....	....	....	....	1

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Ulster county—(*continued*)											
Olive	2,465	40									3
Plattekill	1,866	30					1			2	6
Rochester	2,874	34		2						1	1
Rosendale	6,278	77	2	2	1		7			1	8
Saugerties	6,057	83		2					2	3	5
Saugerties	3,697	73		2					3	2	10
Shandaken	3,053	37									1
Shawangunk	2,406	46		1							6
Ulster	3,582	22							1	1	7
Wawarsing	4,346	47		3			1		3	1	2
Ellenville	2,879	71		4				2	1	3	7
Woodstock	1,675	28									
Warren county	**29,943**	**444**	**2**	**8**		**1**		**2**	**3**	**18**	**34**
Bolton	1,363	15									
Caldwell	1,465	25								1	1
Chester	2,052	22								1	1
Hague	1,042	5									1
Horicon	1,136	13									2
Johnsburg	2,374	31								1	
Luzerne	1,341	14		1							3
Queensbury	2,377	34						1	1	2	1
Glens Falls	12,613	223	2	7		1			2	8	20
Stony Creek	1,019	10									
Thurman	809	13									2
Warrensburg	2,352	39						1			3
Washington county	**45,624**	**686**	**2**	**7**				**6**	**4**	**15**	**47**
Argyle	1,995	48									4

Cambridge	1,878	31							1		2
Dresden	545	8									
Easton	2,247	18									
Fort Ann	2,263	40									13
Fort Edward	5,216	77		2					1	4	4
Sandy Hill	4,473	61	1	1				1	1	3	11
Granville	5,217	78		3						5	8
Greenwich	4,172	66						1		1	4
Hampton	689	8									
Hartford	1,290	24	1								
Hebron	1,679	26									
Jackson	1,059	14									
Kingsbury	1,627	15									
Putnam	505	5									1
Salem	2,978	50									3
White Creek	2,496	26									3
Whitehall	919	23								1	1
Whitehall	4,377	68		1				4	1	1	3
Wayne county	48,660	722	1	11				2	6	7	38
Newark	4,578	79		1						4	7
Arcadia	2,468	30						1			3
Butler	1,786	26									
Galen	2,099	16							2		
Clyde	2,507	43		3					2		3
Huron	1,667	28									2
Lyons	5,824	94		3				1			5
Macedon	2,488	32									
Marion	2,015	36									1
Ontario	2,550	28									1
Palmyra	3,758	73		1						3	7
Rose	2,055	27									1
Savannah	1,733	24		1							2
Sodus	5,118	73	1								4
Walworth	2,137	30									
Williamson	2,670	41							2		1
Wolcott	3,207	42		2							1

Record of each reporting board of health, etc.—(Continued)

NAME OF PLACE	Population	All deaths	Cerebrospinal meningitis	Typhoid fever	Malarial diseases	Scarlet fever	Measles	Whooping cough	Diphtheria	Diarrhea	Consumption
Westchester county	**183,375**	**3,523**	**37**	**37**	**5**	**16**	**10**	**12**	**61**	**232**	**314**
YONKERS	47,931	1,005	20	9		4		4	24	87	113
MOUNT VERNON	20,346	352	1	5		5	3	4	9	27	27
Bedford	3,497	94		1					3		13
Cortlandt	8,345	148	1			1	1	1		9	5
Peekskill	10,358	211		1	2		2		4	24	19
East Chester	3,040	62					1		1	1	4
Greenburg	14,894	256		2	2	1	1		5	11	27
Harrison	2,048	47		1		1				3	5
Lewisboro	1,311	22									
Mamaroneck	3,849	99				1			1	3	13
Mount Pleasant	8,698	234	1	2					1	4	23
New Castle	2,401	38								1	2
NEW ROCHELLE	14,720	274	6	3		1		1	5	18	18
North Castle	1,471	17									
North Salem	1,133	16							1		
Ossining	2,956	13									
Ossining	7,939	123	1	2	1				1	9	15
Pelham	1,571	30									1
Poundridge	823	12									
Port Chester	7,440	165	5	9			2		4	23	5
Rye	5,421	64	1			2		2		3	4
Scarsdale	885	10									1
Somers	1,338	19									2
White Plains	640	5									
White Plains	7,899	168	1	2					2	8	15
Yorktown	2,421	39								1	2

Wyoming county	**30,413**	**466**		**1**					**1**	**3**	**15**
Arcade	1,877	24								1	
Attica	2,677	45									1
Bennington	1,904	31		1							1
Castile	2,539	41									1
Covington	930	11									1
Eagle	1,114	22									1
Gainesville	2,325	32									2
Genesee Falls	658	14									
Java	1,770	29									1
Middlebury	1,406	20									
Orangeville	1,005	21									
Perry	3,862	66								1	5
Pike	1,277	19									
Sheldon	1,801	21									
Warsaw	4,341	60							1	1	2
Wethersfield	927	10									
Yates county	**20,318**	**327**	**1**	**4**			**1**		**3**	**1**	**16**
Barrington	1,249	15									
Benton	1,970	36									1
Dundee	1,291	1									1
Italy	1,094	6									
Jerusalem	2,775	38									3
Middlesex	1,282	14								1	
Milo	1,877	29							1		1
Penn Yan	4,650	93	1	3			1		1		10
Potter	1,520	31		1							
Starkey	1,545	46							1		
Torrey	1,065	18									
State prisons		4									
State Hospital for Insane		1,113		2						2	166
Other public institutions		262		2							23

[395 deaths in public institutions have been credited elsewhere, to the localities in which they are situated.]

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Jan

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under one year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT.										
Totals	4,158,600	7,409	21.0	1,195	920	907	29	37	4	1
CITY OF NEW YORK.										
Totals	3,838,024	6,871	21.0	1,133	883	784	27	33	4	1
BOROUGH OF MANHATTAN	1,940,121	3,858	22.7	654	526	375	17	13	1	...
BOROUGH OF THE BRONX	294,939	491	19.6	63	68	50	5	3	1	...
BOROUGH OF BROOKLYN	1,334,952	2,138	18.9	342	258	298	4	16	2	1
BOROUGH OF QUEENS	193,494	259	15.7	56	20	38	1	1	...	...
BOROUGH OF RICHMOND	74,518	125	20.0	18	11	23	...	...	...	...
Oyster Bay	16,334	18	....	3	1	6	...	...	...	...
Hempstead	27,066	38	16.5	4	4	12	...	...	...	...
North Hempstead	12,048	16	....	4	2	2	...	...	...	...
Southold	8,301	9	....	2	0	1	...	...	...	...
Sag Harbor	3,500	6	....	1	0	3	...	...	...	...
Huntington	9,483	8	....	0	0	2	...	...	...	...
Brookhaven	14,592	24	19.0	1	1	9	...	1	...	...
YONKERS	50,000	80	18.9	12	4	14	...	...	...	...
Greenburgh	15,564	24	18.0	3	2	6	...	...	...	...
MOUNT VERNON	20,346	33	19.1	6	3	4	...	...	...	...
Port Chester	7,440	13	....	0	1	1	...	1	...	...
Ossining	7,939	9	....	2	0	3	...	...	...	...
NEW ROCHELLE	14,720	25	20.0	2	4	3	...	...	...	...
Peekskill	10,358	15	17.7	2	4	6	...	...	...	...
White Plains	7,900	12	....	1	0	3	...	...	...	...
Rest of District	95,000	208	25.0	19	10	48	2	2	...	...
HUDSON VALLEY DISTRICT.										
Totals	606,000	1,052	18.0	150	47	283	1	23	2	...
ALBANY	100,000	135	15.9	19	3	29	...	1	...	...
COHOES	24,000	41	20.0	17	1	4	...	1	...	...
TROY	75,057	135	21.0	19	7	24	...	4	...	...
WATERVLIET	14,321	25	....	1	2	3	...	2	...	...
Green Island	4,770	9	....	1	1	0	...	...	...	...
Hoosick Falls	5,671	6	....	0	0	2	...	...	...	...
RENSSELAER	7,466	21	30.0	5	1	6	...	...	...	...
Coxsackie	4,102	4	....	1	0	1	...	...	...	...
Catskill	5,486	11	....	0	1	6	1	...	...	...
HUDSON	9,528	18	22.3	4	2	6	...	...	...	...
KINGSTON	24,535	43	20.6	12	2	7	...	...	...	...
Ellenville	3,000	2	....	1	0	1	...	...	...	...
Marbletown	3,511	2	....	0	0	2	...	...	...	...
Rosendale	6,278	14	....	4	1	2	...	1	...	...
Esopus	4,907	13	....	2	0	6	...	...	1	...
Saugerties	3,700	5	....	1	1	2	...	...	...	...
POUGHKEEPSIE	24,029	59	28.3	10	7	16	...	2	...	...
Fishkill	13,016	16	....	2	0	8	...	...	...	...
Wappingers Falls	3,504	4	....	0	0	2	...	...	...	...
NEWBURG	25,000	43	20.2	3	1	10	...	...	...	...
Port Jervis	9,385	13	....	1	0	3	...	3	...	...
MIDDLETOWN	14,522	25	20.0	3	1	7	...	...	...	...
Warwick	6,403	4	....	1	0	1	...	...	...	...
Goshen	4,564	6	....	0	0	4	...	...	...	...

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York uary, 1904.

Roman type. Population estimated to date printed in full face figures].

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
123	84	25	9	241	151	772	1,045	824	81	287	640	649	630	239	352	111	273	802
119	81	23	7	230	150	702	990	787	81	247	594	586	549	219	321	94	258	768
49	48	16	4	122	86	340	550	512	47	124	314	315	311	132	202	36	154	465
30	16	1	...	25	11	111	55	37	3	18	40	26	28	11	19	4	13	34
36	17	6	3	73	44	218	317	209	21	90	218	208	169	61	81	44	79	221
1	...	...	...	5	8	19	50	18	10	7	10	23	33	15	11	3	10	34
3	...	...	...	5	1	14	18	11	...	8	12	14	8	...	8	7	2	14
....	...	...	...	...	.....	1	1	1	...	1	.....	3	4	...	1	2	.....	4
....	...	...	2	3	.....	5	6	1	...	2	3	6	3	1	1	2	2	1
....	...	...	...	...	.....	4	3	1	...	.....	1	1	4	...	2	...	.....	.....
....	...	...	...	...	.....	1	1	1	...	1	2	.....	.....	1	...	...	1	1
....	...	...	...	...	.....	1	.....	.....	...	1	.....	.....	1	...	1	1	.....	1
....	...	...	...	...	.....	1	.....	.....	...	.....	.....	3	3	...	...	...	1	.....
....	...	...	...	...	.....	2	2	2	...	4	.....	5	3	...	1	3	.....	1
3	...	...	...	...	.....	19	8	6	...	4	8	8	7	3	2	...	4	8
....	...	...	...	2	.....	.....	1	3	...	1	2	1	5	3	2	2	1	1
1	...	1	...	2	.....	2	5	3	...	4	1	4	3	1	2	2	.....	2
....	...	...	...	...	.....	2	2	1	...	2	1	1	1	...	1	...	1	.....
....	...	...	...	...	.....	1	2	.....	...	.....	1	3	.....	...	1	...	.....	1
....	...	...	...	1	.....	1	4	3	...	1	4	2	5	...	1	...	1	2
....	1	...	...	2	.....	2	1	.....	...	1	1	3	.....	1	...	...	1	2
....	...	...	...	...	.....	2	.....	.....	...	2	.....	2	2	...	4	...	.....	.....
....	2	1	...	1	1	26	19	15	...	16	22	21	40	10	12	5	3	10
2	7	1	1	9	13	109	132	61	3	80	71	140	140	43	29	50	44	91
....	...	...	...	1	5	13	18	5	...	11	20	26	4	7	2	2	8	12
....	...	...	...	1	1	3	6	1	...	6	.....	1	6	1	2	...	1	11
....	...	...	...	1	1	23	14	9	1	14	6	19	13	4	3	5	5	13
....	...	...	...	...	.....	5	4	1	1	3	2	3	4	...	...	...	.....	.....
....	...	...	...	...	.....	1	1	.....	...	.....	.....	1	2	...	2	...	.....	2
....	...	...	...	...	.....	.....	.....	1	...	.....	.....	3	1	1	...	...	.....	.....
....	...	...	...	...	.....	.....	2	.....	...	3	1	4	2	4	...	1	.....	4
....	...	...	...	...	.....	.....	1	1	...	.....	.....	.....	2	...	...	...	.....	.....
....	...	...	...	...	.....	1	.....	1	...	.....	.....	3	2	...	...	1	1	1
....	1	...	...	...	.....	1	1	.....	...	2	.....	2	4	...	1	1	3	2
....	...	...	...	1	.....	7	8	2	...	4	2	2	4	4	1	2	.....	6
....	...	...	...	...	.....	.....	.....	1	...	.....	.....	.....	.....	...	...	...	1	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	1	1	...	...	...	.....	.....
....	2	...	...	...	.....	3	2	.....	...	1	.....	1	2	...	1	...	.....	1
....	...	...	...	...	.....	1	1	1	...	.....	.....	4	1	...	...	1	1	2
....	...	...	...	1	.....	1	1	.....	...	.....	1	1	.....	...	...	...	.....	.....
....	4	...	...	...	2	7	6	2	...	7	3	5	6	1	3	5	2	4
....	...	...	...	...	.....	.....	.....	3	...	1	2	4	1	1	1	1	1	1
....	...	...	...	...	.....	.....	.....	.....	...	.....	1	1	1	...	...	1	.....	.....
....	...	...	...	...	.....	10	6	2	...	.....	3	7	5	...	2	1	5	2
....	...	...	...	...	.....	1	3	1	...	.....	.....	.....	.....	1	...	1	1	2
....	...	...	...	...	1	1	2	2	...	1	2	2	6	2	...	2	2	2
....	...	...	...	...	.....	.....	2	.....	...	1	.....	.....	1	...	...	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	1	1	.....	.....	2	...	...	1	1	.....

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT—(*Con.*)										
Montgomery	5,939	4	....	1	0	0	...	...	...	...
Haverstraw	9,874	10	....	0	1	2	...	...	...	...
Nyack	4,275	......	....	......	......	....	...	...	...	...
Ramapo	7,502	17	....	1	2	8	...	...	1	...
Rest of District	271,800	367	16.2	41	13	121	...	9	...	...
ADIRONDACK AND NORTHERN DISTRICT.										
Totals	395,000	472	14.0	60	17	163	1	7	...	1
WATERTOWN	21,700	30	16.3	5	3	5	...	3	...	...
Ellisburgh	3,888	7	....	0	0	5	...	...	...	...
Cape Vincent	2,882	2	....	1	0	1	...	...	...	...
Clayton	4,313	6	....	1	0	3	...	...	...	...
OGDENSBURG	12,633	25	23.3	7	1	8	...	...	...	...
Gouverneur	6,000	8	....	1	1	4	...	...	...	...
Potsdam	3,843	4	....	0	0	2	...	...	...	...
Canton	6,387	4	....	1	0	1	...	1	...	...
Malone	5,935	14	....	4	0	1	...	...	...	...
PLATTSBURG	8,434	12	16.6	1	0	0	...	...	...	1
Glens Falls	12,613	13	12.0	0	0	8	...	...	...	...
Whitehall	4,377	5	....	3	1	1	...	...	...	...
Fort Edward	5,216	4	....	0	0	1	...	...	...	...
Sandy Hill	4,473	5	....	1	0	0	...	...	...	...
Granville	5,217	3	....	1	0	1	...	...	...	...
Greenwich	4,172	5	....	0	0	2	...	...	...	...
Lowville	3,746	8	....	0	0	7	...	...	...	...
Rest of District	279,000	317	13.3	34	11	113	1	3	...	...
MOHAWK VALLEY DISTRICT.										
Totals	420,000	566	15.8	78	23	188	1	10	...	...
SCHENECTADY	50,000	60	14.5	13	3	10	...	3	...	...
Cobleskill	3,973	2	....	0	0	0	...	...	...	...
AMSTERDAM	20,929	32	18.0	6	3	5	...	...	...	...
Fort Plain	2,444	4	....	2	0	2	...	...	...	...
JOHNSTOWN	10,130	12	....	3	0	5	...	...	...	...
GLOVERSVILLE	18,349	25	14.2	3	0	10	...	1	...	...
LITTLE FALLS	10,381	10	....	0	0	5	...	...	...	...
Herkimer	5,555	1	....	0	0	0	...	...	...	...
Ilion	5,138	8	...	0	1	0	...	...	...	...
UTICA	56,383	85	17.5	18	5	16	...	1	...	...
Whitestown	6,235	10	....	0	1	2	...	...	...	...
Rome	15,343	23	17.7	1	0	5	...	...	...	...
Boonville	3,332	11	....	2	2	5	...	1	...	...
Camden	3,745	5	....	0	1	2	...	...	...	...
Waterford	6,157	9	....	1	0	2	...	1	...	...
Mechanicville	4,695	1	....	0	0	1	...	...	...	...
Ballston Spa	3,923	11	....	1	0	6	...	...	...	...
Saratoga Springs	12,409	23	22.0	2	2	6	...	...	...	...
Rest of District	183,250	234	14.5	26	5	106	1	3	...	...
SOUTHERN TIER DISTRICT.										
Totals	430,000	600	16.4	50	32	205	1	6	...	1
BINGHAMTON	40,000	50	14.7	4	0	13	...	...	...	...
Owego	5,039	14	....	1	0	5	...	...	...	...
Candor	3,330	4	....	0	0	2	...	...	...	...
Waverly	4,500	5	....	0	0	1	...	...	...	...
ELMIRA	35,672	45	15.0	3	1	15	...	1	...	...

FOR JANUARY—(*Continued*).

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
						1	2						1					
				1			5					3						1
				1		1	2	2		1	1	2	3			1	1	1
2		1	1	2	3	29	45	26		24	27	45	66	17	11	24	11	44
3			3	4	2	42	32	27	2	24	39	76	70	22	15	38	20	44
				2		1	5	5	1	1		3	2	1	1		4	1
								1			1		1			1	2	1
																1		1
												1	2			1		2
						1	3	2				5	1	3	1	2	1	6
							1			1		2	1	1			2	
				1						1				1			1	
							1					1						1
						1	1			1	4	3	2					2
											1	4	2		1			3
						2				2	1	1	3			1	1	2
			1				1					1	1					1
											1	2				1		
					1	1							3					
						1	1											1
							1	2			1		1					
						1					2	1		2		2		
3			2	1	1	34	18	17	1	18	28	52	51	14	12	29	9	23
3		2	4	15	8	50	39	28	5	42	39	67	72	29	25	48	26	53
			1	2	4	6	6	4		2	7	3	3	4	2	2	2	9
																	2	
2				1	1	4	1	1		3	1	5	3	2	1	1	1	5
			1									1	1					1
						1						1	3	1		2	1	3
						2	1	2			2	2	5			5	2	3
						1				1		1	5			2		
														1				
				1		1				1	1	3						1
		1		3	1	6	11	3	1	10	2	10	10	4	5	5	4	8
				1		1	1		1	2	2	1		1				
						7	1			4	1	2	2	1	1	1		3
			1				1			1		1	1	1		2	1	1
							1						1		2		1	
						2	2				1		1			1	1	
							1											
						2	1				1	1	2	1		2		1
				2		1	2	5		3	4	3	1	1	1			1
1		1	1	5	2	16	10	13	3	15	17	34	34	12	13	25	11	17
17	3	1	2	7	1	31	53	28	4	53	44	97	87	29	25	51	24	35
	2					3	3	3		6	3	9	8	3	2	4	2	2
				1		1	1	1		1		2	3			3		1
											1	1	1	1				
							2			1		2						
					1	2	9	1		4	3	10	4	4	3	1	2	

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*)										
Horseheads	5,000	5	....	0	1	2	...	1	...	...
HORNELLSVILLE	12,000	9	9.0	1	1	1	...	...	...	...
Bath	5,000	2	....	0	0	0	...	...	...	...
CORNING	11,061	29	30.0	3	1	9	...	1	...	...
Wellsville	5,000	9	....	0	1	2	...	...	...	...
OLEAN	9,462	10	....	1	0	1	...	1	...	...
Salamanca	4,251	11	....	2	1	2	...	...	...	...
DUNKIRK	11,616	37	38.0	8	9	3	...	...	...	...
JAMESTOWN	22,892	30	15.3	4	1	5	...	...	...	...
Westfield	2,430	3	....	0	0	2	...	...	...	...
Fredonia	4,125	9	....	2	1	3	...	...	...	...
Rest of District	248,600	328	15.3	21	15	139	1	2	...	1
EAST CENTRAL DISTRICT. Totals	404,500	576	16.8	56	15	223	4	7	1	...
SYRACUSE	110,000	167	18.0	22	10	36	3	...	...	...
Baldwinsville	3,000	8	....	1	0	6	...	...	...	...
DeWitt	5,435	9	....	1	0	2	1	1	...	...
CORTLAND	9,014	7	....	0	0	4	...	...	...	...
Homer	2,381	3	....	1	0	0	...	...	...	...
ONEIDA	7,942	13	19.0	1	0	7	...	...	...	...
Hamilton	3,744	5	....	1	0	2	...	...	...	...
Cazenovia	3,830	6	....	0	0	5	...	...	...	...
Canastota	3,300	1	....	0	0	1	...	...	...	...
Norwich	5,766	5	....	2	0	2	...	...	...	...
Oneonta	7,147	8	....	0	0	4	...	1	...	...
Worcester	2,409	......	....	......	......	......	...	...	...	...
Cooperstown	2,368	6	....	1	0	3	...	...	...	...
Walton	4,869	4	....	0	0	2	...	...	...	...
Delhi	3,243	5	....	0	0	3	...	...	...	...
Liberty	4,568	17	....	2	1	1	...	...	...	...
Rest of District	225,540	312	16.2	24	4	145	...	5	1	...
WEST CENTRAL DISTRICT. Totals	320,600	435	16.0	22	17	180	1	6	...	...
AUBURN	35,000	40	13.5	3	2	8	...	...	...	...
ITHACA	13,136	30	27.0	1	3	9	...	1	...	...
Hector	4,137	6	....	0	0	3	...	...	...	...
Waterloo	4,256	9	....	1	0	4	...	1	...	...
Seneca Falls	6,519	10	....	0	1	8	...	...	...	...
GENEVA	10,433	20	22.0	1	2	7	...	...	...	...
Canandaigua	6,151	9	....	0	1	4	...	...	...	...
Manchester	4,733	7	....	1	0	5	...	...	...	...
Phelps	4,788	5	....	0	0	4	...	...	...	...
Penn Yan	4,650	10	....	0	0	6	...	...	...	...
Batavia	9,180	12	....	1	0	5	1	...	...	...
Dansville	3,633	3	....	0	0	2	...	...	...	...
Le Roy	3,144	6	....	1	0	3	...	...	...	...
Warsaw	4,341	3	....	1	0	0	...	...	...	...
Rest of District	206,500	265	15.4	12	8	112	...	4	...	...
LAKE ONTARIO AND WESTERN DISTRICT. Totals	910,200	1,178	15.3	139	68	297	5	28	2	...
BUFFALO	380,000	457	14.2	65	31	63	3	13	...	...
TONAWANDA	7,421	7	....	0	1	0	...	...	...	...
Amherst	4,223	2	....	0	0	1	...	...	...	...
NORTH TONAWANDA	9,069	6	....	1	0	2	...	...	...	...
LOCKPORT	16,581	31	22.5	4	2	9	...	...	...	...

FOR JANUARY—(*Continued*).

Diseases. Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Other Causes of Death. Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
													8			1		
				1		1					1	1	2		1			2
															2			
						1	3			2	4	3	3	2	3	2	3	2
				1		1				3				4				
						1	2		1				3	1				1
						1	1	1		1	1	1		1	1		1	2
16	1	1					3			1	2	1	2		2	2		6
				1		4	4	2		2	3	2	3		1	2	3	3
								1				1				1		
1							2					2	2					2
			2	3		16	23	19	3	32	26	62	53	13	10	35	13	14
1			2	5	6	50	69	30		39	35	79	85	23	19	53	30	38
1				3	3	14	26	11		16	7	22	21	5	9	8	8	10
								1		1		3	1			1	1	
				1			2	1		1					1			1
						1				1	1	2	1				1	
												2						1
						1	1	1			1	4	1	1		2		1
							1	1						1		1		1
												2	2			2		
											1							
										3						1		1
							1	1		1	1		2			1		
						1							2	2				1
							2							1			1	
							1						1	1	1	1		
						8	1	1				1	3		1		1	1
			2	1	3	25	34	13		16	24	43	51	12	7	36	18	21
	1	2	1	6	1	34	37	28	1	29	37	71	69	22	16	36	12	25
						7	4	3		3	4	4	3	5		2	1	3
	1			1		3	5	5		2	1	1	4	1	2	1	1	2
										1	1	1	2			1		
							2				1	2	2					1
								2		1		1	3			2	1	
		1		2		2	1	2			2	3	2	1	1	2		1
							1	1	1	2	1	1	1			1		
											1	1	2	1	2			
								1			2	1				1		
						1	1			1		3	2			1		1
						1	2				1	3	1	1		1	1	
												2					1	
										1		1	1	1		1		1
								1				2						
		1	1	3	1	20	21	13		18	23	45	46	12	11	23	7	16
12		5		31	11	99	103	71	10	90	86	155	166	52	59	76	41	76
		3		11	6	46	39	35	6	28	39	50	66	21	25	16	21	29
						2	1	1		1	1	1						
						1	1											
							1					1	1	1		1		1
				3		1	3	2		4		8	1	2		3	2	2

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under one year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*).										
NIAGARA FALLS	20,000	37	22.0	6	2	7	...	5	...	...
Medina	4,716	5	....	1	0	1	...	...	...	...
Albion	4,477	6	....	1	0	2	...	...	...	...
Brockport	3,400	6	....	0	0	2	...	...	...	...
ROCHESTER	165,000	255	18.1	27	18	60	...	6	...	...
Palmyra	3,758	4	....	1	0	1	...	...	...	...
Newark	4,578	5	....	1	0	2	...	...	...	...
Lyons	5,824	11	....	0	0	7	...	1	...	...
Clyde	2,507	5	....	0	0	0	...	1	...	...
OSWEGO	22,200	40	21.2	7	2	13	...	...	...	...
FULTON	8,734	8	....	0	0	2	...	1	...	...
Richland	3,535	6	....	0	0	3	...	...	...	...
Rest of District	244,184	287	14.0	25	12	122	2	1	2	...
Totals for the State	7,735,000	12,288	18.7	1,750	1,139	2,447	43	124	9	3
Average for past five years	....	11,523	18.7	......	2,679*	2,215	41	159	13	14

* All deaths under 5 years of age.

REMARKS—Cold weather with an average mean six degrees below the normal prevailed throughout the State during January. The Station at Albany reporting the lowest temperature of —24 degrees with a mean of 15 degrees for the month, and the greatest number of days in which the temperature fell below zero. At the same time the eastern part of the State had the greatest number of clear days with a deficiency in precipitation, the rest of the State reporting an excess, with northwest winds prevailing in the eastern against southerly and westerly in the central and western parts of the State. Maximum velocities of wind of 55 miles per hour were reported in New York and Buffalo; in Albany of 28 and the other Stations of 40. Temperatures below zero were distributed through the month, the lowest occurring on the 5th and the highest on the 22d.

CLASSIFICATION OF CAUSES OF DEATH—With the commencement of the 20th volume of this MONTHLY BULLETIN it will be noted that a few changes are made in the classification of the causes of death.

It is generally unwise to deviate from an established form since confusion is thereby caused in the comparisons that are to be made with statistics that have preceded; this is especially the case where large masses of data are involved, such as those of the mortality of a large State. Changes are very conservatively made in the published statistics of State and National health departments. In this State we have the collated records month by month of a yearly mortality of from 100,000 deaths in the early years of our publication to 125,000 in the later years; of eight districts with the varying conditions of life peculiar to each into which the State is divided in which from 5,000 to 75,000 deaths have annually occurred; of monthly records showing in some 8,000 deaths, in others 13,000. We have the records of mortality of certain ages under the varying conditions of locality and season; of deaths from our common preventible causes in like manner; likewise of deaths in various large and well recognized groups of disease. With no essential change these facts have been published from the first on what will be found a very satisfactory plan for reference, giving a vast amount of material for statisticians and for practical, sanitary study. The plan was that established years ago by the National Board of Health, is simple and direct, and especially useful for sanitarians, for whose purpose it has been primarily carried out.

It is not intended to deviate materially from this established, comparable plan; the desirableness of having our records comparable with, and so far as possible uniform with, those that are universal is recognized. Such a plan is the International Classification of Causes of Death followed by the United States Census office. In detail this classification is possible for a single locality. A manual for guidance in it is issued from the Census office. The data heretofore given in the BULLETIN can be used for comparison with this system, and no essential change need be made in the publication of those that we have been giving to have the matter accord with the universal plan while at the same time continuing to be uniform with the established State plan. It is not possible to make a record of a large number of localities in such detail as is possible for a city, with the range of the publication we carry on, but it is possible to make such data as are given correspond with the international classification, and that we will undertake to do. It is recommended to the cities and such other local municipalities as tabulate their records to in like manner adhere to this universal system, and to follow such changes as hereafter may be made in bringing this system into accord with advancing knowledge, the constant addition to which make any system but temporarily approach perfection.

FOR JANUARY—(*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	....	....	....	...	1	3	1	1	...	5	2	4	5	1	2	1	1	5
....	....	....	....	...	.....	2	.....	.....	...	.....	.....	.....	1	...	...	1	.....	1
....	....	....	....	...	.....	.....	.....	.....	...	1	1	1	1	...	...	1	.....	1
....	....	....	....	1	.....	.....	.....	.....	...	.....	1	2	1	...	...	...	1	.....
9	...	1	...	8	2	22	28	14	2	21	19	33	34	10	10	14	8	14
....	....	....	....	...	.....	.....	.....	.....	...	1	.....	2	.....	...	...	1	.....	.....
....	....	....	....	...	.....	.....	2	.....	...	.....	.....	.....	.....	...	1	...	1	1
....	....	....	....	...	.....	.....	1	1	...	.....	1	.....	3	...	...	4	.....	.....
....	....	....	....	...	.....	.....	.....	.....	...	2	.....	.....	1	...	1	...	.....	.....
....	....	....	....	1	.....	4	2	1	...	2	1	9	7	2	3	3	1	4
....	....	....	....	...	.....	1	.....	.....	...	1	1	.....	2	...	2	...	.....	.....
....	....	....	....	...	.....	.....	.....	.....	1	.....	.....	2	2	...	...	1	.....	.....
3	...	1	...	7	2	17	24	16	1	24	20	42	41	15	15	30	6	18
161	95	36	22	318	193	1,187	1,510	1,097	106	644	991	1,334	1,319	459	540	463	470	1,164
99	87	37	67	312	163	1,202	.....	†2,420	97	648	873	1,138	1,202	404	497	592	.....	‡1,465

† Includes all acute respiratory diseases. ‡Includes the preceding column.

Age at death is important for record. This will occur to any one on a glance at the summary of mortality for 1903 printed in the last BULLETIN; nearly one third of the deaths in the great urban Maritime district were under the age of five years, whilst in one of the rural districts only one eighth of the deaths were of this age. At the same time one third of the deaths in the rural district occurred above the age of 70, and one tenth only in the Maritime district. Hereafter we will report the mortality under one year of age and likewise that between one and five years, which will give added information without affecting comparability, since the two columns added together will give the same facts as have been heretofore reported.

EPIDEMIC diseases is a term substituted for zymotic diseases, a change only in name to correspond with that used in the international classification. With but one exception, those important diseases heretofore reported will continue to be; *diarrheal* diseases will hereafter be limited to a record only of those occurring under five years of age, and of this reporters are requested to make note. This change is made on advice of those interested in the subject of pediatrics; it is not likely to materially change this record of mortality from that heretofore made, and will make exact what shall come under this head.

Under the term *general diseases* the international classification includes (A) Epidemic diseases and (B) Other general diseases. Heretofore no attempt has been made to make a record separately of the latter. They are now taken out of the unclassified group and made a special record of, i. e., all of them not already specially recorded. Consumption (pulmonary) is one of these, and, as heretofore, will include tuberculosis of the lungs and larynx; cancer likewise of whatever part will remain as a record. With these exceptions, the records of general disease now made will include death from diseases specified in the census classification; tuberculosis, other than pulmonary; Pott's disease, cold abscess, white swelling, scrofula; septicæmia, glanders, rabies, trichinosis; syphilis, rheumatism and gout, diabetes, scurvy; exophthalmic goitre, Addison's disease, anæmia and chlorosis; alcoholism, acute and chronic; chronic poisoning from whatever cause and other general diseases, all as noted on the classification list. Most of this has heretofore gone into the unclassified group, beside which it is now placed for ready comparability with past records.

PNEUMONIA will be taken out of the group of acute respiratory diseases and given a separate record. Its growing importance in sanitary affairs makes this desirable. It is to be understood that this term includes only acute lobar croupous pneumonia, and that it does not include catarrhal or broncho-pneumonia. While many prefixes to this name appear on our death returns, it is pretty safe to say that physicians generally understand the distinction as to the infectious disease we desire to specially record.

In other respects the records of the BULLETIN will continue to be as heretofore, and if doubt arises on the part of reporters or observers as to what the name of a class includes they may understand that, with such exception as the other heads may make, there are to be included such as appear in the published International Classification.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Feb

Cities are printed in SMALL CAPITALS, villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebro spinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT. Totals	4,158,600	7,539	22.6	1,211	915	801	23	33	6	1
CITY OF NEW YORK. Totals	3,838,024	7,017	23.0	1,139	874	692	22	30	6	1
BOROUGH OF MANHATTAN	1,940,121	3,952	24.9	681	471	274	14	14	2	...
BOROUGH OF THE BRONX	294,939	450	19.0	62	119	47	...	1	...	...
BOROUGH OF BROOKLYN	1,334,952	2,229	22.3	340	259	294	8	14	2	1
BOROUGH OF QUEENS	193,494	257	16.6	38	20	48	...	1	2	...
BOROUGH OF RICHMOND	74,158	129	20.8	18	5	29	...	...	...	...
Oyster Bay	16,334	33	....	4	1	6	...	...	...	...
Hempstead	27,066	29	14.0	7	2	7	...	...	...	...
North Hempstead	12,048	8	....	3	0	1	...	...	...	...
Southold	8,301	14	....	0	1	4	...	...	...	...
Sag Harbor	3,500	1	....	0	0	1	...	...	...	...
Huntington	9,483	8	....	1	0	3	...	...	...	...
Brookhaven	14,592	30	....	4	2	11	...	1	...	...
YONKERS	50,000	100	25.0	15	11	17	1	2	...	...
Greenburgh	15,564	14	....	1	1	2	...	...	...	...
MOUNT VERNON	20,346	27	....	5	4	6	...	...	...	...
Port Chester	7,440	9	....	1	3	0	...	...	...	...
Ossining	7,939	5	....	0	0	1	...	...	...	...
NEW ROCHELLE	14,720	27	....	7	5	1	...	...	...	...
Peekskill	10,358	19	....	5	1	4	...	...	...	...
White Plains	7,900	10	....	1	0	3	...	...	...	...
Rest of District	95,000	188	24.5	18	10	42	...	...	...	...
HUDSON VALLEY DISTRICT. Totals	696,000	1,152	20.7	143	69	284	8	38	...	...
ALBANY	100,000	182	22.9	17	11	33	2	1	...	...
COHOES	24,000	45	24.3	9	4	2	...	8	...	...
TROY	75,057	147	24.0	21	7	23	...	4	...	...
WATERVLIET	14,321	12	....	2	4	0	...	1	...	...
Green Island	4,770	7	....	3	1	0	1	...	...	...
Hoosick Falls	5,671	12	....	1	1	3	...	1	...	...
RENSSELAER	7,466	23	....	5	3	4	1	3	...	...
Coxsackie	4,102	16	....	3	0	3	1	...	...	...
Catskill	5,486	9	....	1	0	4	...	1	...	...
HUDSON	9,528	27	....	3	1	7	...	4	...	...
KINGSTON	24,535	29	15.0	2	2	5	...	...	...	...
Ellenville	3,000	8	....	3	0	1	...	1	...	...
Marbletown	3,511	2	....	0	0	1	...	...	...	...
Rosendale	6,278	4	....	1	0	1	...	1	...	...
Esopus	4,907	8	....	1	1	1	...	1	...	...
Saugerties	3,700	5	....	0	0	2	...	...	...	...
POUGHKEEPSIE	24,029	48	26.0	13	5	7	...	3	...	...
Fishkill	13,016	16	....	2	0	2	...	2	...	...
Wappingers Falls	3,504	3	....	1	1	0	...	...	...	...
NEWBURGH	25,000	48	24.5	8	3	11	...	...	...	...
Port Jervis	9,385	9	....	0	1	4	...	...	...	...
MIDDLETOWN	14,522	19	16.0	2	2	7	...	...	...	...
Warwick	6,403	6	....	1	0	2	...	...	...	...
Goshen	4,564	14	....	2	0	4	...	...	...	...
Montgomery	5,939	11	....	2	0	3	...	...	...	...
Haverstraw	9,874	10	....	2	0	2	...	...	...	...
Nyack	4,275	14	....	1	1	3	...	1	...	...
Ramapo	7,502	13	....	0	2	5	...	...	...	...
Rest of District	271,800	405	19.0	37	19	144	3	6	...	...

DEPARTMENT OF HEALTH—VOLUME XX.

***districts, cities, villages and towns in the State of New York ruary,* 1904.**

Roman type. Population estimated to date printed in full face figures.]

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
122	73	30	18	224	166	772	1,215	736	102	292	671	669	537	229	327	119	312	862
120	71	30	16	218	158	728	1,154	698	96	257	623	569	483	207	294	95	289	822
53	41	20	8	124	106	375	632	462	73	132	321	318	260	130	178	44	144	501
31	4	1	2	7	7	111	43	32	2	18	40	34	21	4	14	7	25	46
34	25	8	4	71	39	216	403	176	20	93	227	203	166	62	86	37	93	241
2		1	1	14	5	19	49	13	1	10	24	32	24	6	10	4	18	21
	1		1	2	1	7	27	15		4	11	12	12	5	6	3	9	13
				1		1	6	1		2		7	2	1	3	2	4	3
	1					2	5	3	2	2	1	1	4	3		2		3
				1			1			3	1							2
							3		1	1	2	2	1			3		1
																1		
						1				1		1	1		1	2	1	
						3		3		4	3		6	6	4	3		1
			2	1	4	9	15	7	1	3	14	15	5	2	2	1	5	10
						2	2	2		2	1		2	3		1		1
				1		2	5	2		1	6	3	2	1		2	1	1
						1	2	3						1	1		1	
										1	1		1	1			1	
				1		1	1	5		4	1	4		1	4	1	2	3
					3	1	3				2	4	1	1	1		3	
						1	3	2	1			2	1					
2	1			1	1	20	15	10	1	11	16	31	28	8	17	6	5	15
4	7	4	4	12	12	114	139	73	5	81	76	133	161	45	45	66	47	78
1		2	1	1		16	28	11	1	8	16	27	30	6	8	7	10	6
3					2	9	2	2	1	4	3		2		3		1	5
					4	15	14	13		15	13	13	20	8	2	4	9	13
				1				2	1		1	1	2				1	2
						1				1		1	2					1
						2	1					3	3					2
				1		3	3	1		1		4	2			1		3
							5	3					2	2	1		1	1
								1		1		2	2	1				1
				1	1	1		4		2	2	1	2	1	3	3		2
				1		3	5	1		5	2	2	4	1		1	2	2
			1			1	1			1				1				2
	1															1		
							2				1							
										1		2	2					2
						1	2			1	1							
	3				2	2	3			6	3	5	4	5	1	2	1	8
						3	1	1		1		3	1		1	2		1
						1	1										1	
	2			2		6	4	5		3	2	5	6	7	2	1	1	2
							1	1				1	2			3		1
				1		2	3	1			3	3	3			1		2
							1				2	1	1		1			
						3	3			2			3		1		1	1
						2	2	1		1		2				1	1	1
							1			1		1	3		1	2	1	
				1		1	1				2	1	2	1		2	1	1
								3			1	2	2		1	2		2
	1	2	2	3	3	42	55	23	2	27	24	53	61	12	20	33	16	17

SANITARY DISTRI	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
ADIRONDACK AND NORTHERN DISTRICT.										
Totals	395,000	509	17.0	67	23	158	2	33		
WATERTOWN	21,700	74	42.0	7	0	12		22		
Ellisburgh	3,888	4		0	0	4				
Cape Vincent	2,882	4		1	0	1		1		
Clayton	4,313	6		1	0	2				
OGDENSBURG	12,633	21	21.0	2	2	5				
Gouverneur	6,000	13		1	0	5				
Potsdam	3,843	6		0	1	1		1		
Canton	6,387	13		1	2	3		2		
Malone	5,935	15		1	1	2	2			
PLATTSBURG	8,434	12		4	1	3				
Glens Falls	12,613	20		2	0	6		4		
Whitehall	4,377	5		0	2	0				
Fort Edward	5,216	2		0	0	1				
Sandy Hill	4,473	7		0	1	2				
Granville	5,217	6		2	0	1				
Greenwich	4,172	7		0	0	1				
Lowville	3,746	11		1	0	4				
Rest of District	279,000	283	13.0	44	13	105		3		
MOHAWK VALLEY DISTRICT.										
Totals	420,000	604	18.0	73	23	194	5	8		
SCHENECTADY	50,000	57	14.5	6	3	12	1	2		
Cobleskill	3,973	2		0	0	2				
AMSTERDAM	20,929	30	18.0	7	1	5				
Fort Plain	2,444	6		0	1	3				
JOHNSTOWN	10,130	11		2	0	5				
GLOVERSVILLE	18,349	19		1	2	8				
LITTLE FALLS	10,381	9		1	1	5				
Herkimer	5,555	3		2	0	0				
Ilion	5,138	9		1	0	1				
UTICA	56,383	96	20.0	15	4	20		2		
Whitestown	6,235	4		0	0	1				
ROME	15,343	10		0	0	6				
Boonville	3,332	5		0	0	1				
Camden	3,745	9		1	0	3				
Waterford	6,157	7		2	0	1				
Mechanicville	4,695	8		0	0	1				
Ballston Spa	3,923	4		1	0	0	1			
Saratoga Springs	12,409	28		2	1	5				
Rest of District	183,250	287	19.0	32	10	115	3	4		
SOUTHERN TIER DISTRICT.										
Totals	430,000	648	18.6	66	26	248	3	4	1	
BINGHAMTON	40,000	76	22.5	10	9	21				
Owego	5,039	8		1	0	3				
Candor	3,330	5		0	0	2				
Waverly	4,500	6		1	1	2	1			
ELMIRA	35,672	50	17.5	6	0	20		2		
Horseheads	5,000	4		0	0	2				
HORNELLSVILLE	12,000	19	20.0	2	1	7				
Bath	5,000	4		0	0	2				
CORNING	11,061	19	21.0	2	1	8				
Wellsville	5,000	7		0	0	3				
OLEAN	9,462	15		2	0	3				
Salamanca	4,251	5		1	0	0				

FOR February—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
2	...	2	1	9	4	37	54	24	5	27	25	62	62	25	20	48	22	45
...	...	2	...	...	...	3	8	3	...	3	2	8	4	3	2	4	4	6
...	...	...	...	...	...	...	...	...	...	1	...	1	1	...	...	1	...	...
...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1
...	...	...	...	...	...	1	...	...	...	...	1	1	...	...	...	2	...	1
...	...	...	...	1	...	1	2	...	...	...	4	2	1	3	...	3	1	3
...	...	...	...	...	...	1	...	...	...	...	...	1	3	5	...	1	1	1
...	...	...	...	...	...	1	...	...	...	...	...	2	...	...	2	...	...	...
...	...	...	...	...	...	1	...	1	1	2	1	2	1	...	...	...	...	2
...	...	...	...	...	...	3	1	...	...	1	1	2	2	...	...	...	2	1
1	...	...	...	1	...	...	...	1	...	...	2	2	1	...	...	1	...	3
...	...	...	...	...	...	3	4	...	...	1	...	2	3	...	...	1	...	2
...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	2	...	...	...
...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...
...	...	...	...	1	...	2	2	...	...	...	1	...	...	1	...	...	...	...
...	...	...	...	...	1	1	...	...	...	...	...	...	1	...	1	1	...	1
...	...	...	...	...	...	1	...	1	...	...	3	1	1	...	...	...	...	...
...	...	...	...	...	...	...	2	2	...	1	...	2	2	...	1	...	...	1
1	...	...	1	6	3	19	31	15	4	18	10	35	42	13	12	33	14	23
1	2	3	2	8	4	41	80	22	5	33	42	84	77	20	31	47	38	51
...	...	...	...	1	...	7	7	1	...	5	4	7	6	2	4	3	3	4
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...
...	...	...	...	1	1	3	2	2	...	...	1	6	6	1	1	1	1	4
...	...	...	...	1	...	...	1	...	...	...	...	...	1	...	...	2	1	...
...	...	...	...	...	2	1	2	...	...	1	...	...	4	...	1	...	...	...
...	...	...	...	...	...	...	3	1	...	2	1	3	6	...	...	...	3	...
...	...	1	...	1	...	...	1	...	...	...	2	1	1	...	...	...	1	1
...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	1
...	...	...	...	...	...	...	2	...	...	1	...	2	...	...	...	1	1	2
...	2	1	...	...	...	5	12	4	...	4	8	14	13	3	5	5	10	8
...	...	...	...	...	...	1	1	...	...	...	...	1	1	...	...	...	...	...
...	...	1	...	...	...	1	2	...	...	...	...	...	3	...	...	2	1	...
...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	1	1	1	...
...	...	...	...	...	...	1	4	...	...	1	...	...	2	...	...	...	...	1
...	...	...	...	...	...	1	...	...	...	1	1	1	...	1	...	...	1	1
...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	3	1	1	...
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	1	...
...	...	...	...	...	...	4	5	1	...	3	4	5	1	1	1	1	...	2
1	...	...	2	4	1	17	35	11	5	14	21	44	31	12	13	29	13	27
8	11	2	5	10	4	40	64	24	5	51	52	99	87	25	32	60	14	47
...	9	...	1	...	...	8	6	4	...	8	10	6	7	1	7	5	...	4
...	...	...	...	1	...	...	1	...	...	...	...	2	1	...	...	1	1	1
...	...	...	...	...	...	1	...	...	...	...	2	...	2	...	...	...	...	...
...	...	...	...	...	...	1	...	...	...	1	...	...	1	...	1	...	...	1
...	...	1	...	...	...	3	5	...	...	3	6	11	7	4	1	3	1	3
...	...	...	...	...	...	1	...	...	...	...	...	1	1	...	...	1	...	...
...	...	...	...	2	...	1	1	...	...	...	1	2	4	2	...	3	1	2
...	...	...	...	...	...	...	...	...	...	...	1	1	...	1	...	1	...	...
...	...	...	1	2	...	...	2	1	...	1	2	3	3	1	2	1	...	...
...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	2	2	1
...	...	...	...	...	...	2	...	2	...	1	3	1	2	...	3	...	...	1
...	...	...	...	...	...	...	...	...	...	1	1	1	...	1	...	...	...	1

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*)										
DUNKIRK	11,616	31	32.0	10	7	4	...	...	...	...
JAMESTOWN	22,892	30	16.5	2	1	13	1	1	...	...
Westfield	2,430	6	....	0	0	4	...	...	...	...
Fredonia	4,125	11	....	2	0	4	...	...	...	...
Rest of District	248,60	352	17.5	27	6	150	1	1	1	...
EAST CENTRAL DISTRICT. Totals	404,500	588	18.2	63	16	209	2	2	...	...
SYRACUSE	110,000	167	20.0	23	10	81	1	...	...	...
Baldwinsville	3,000	3	....	1	0	1	...	...	...	...
DeWitt	5,435	7	....	2	0	1	...	...	...	...
CORTLAND	9,014	6	....	0	0	2	...	...	...	...
Homer	2,381	3	....	0	0	2	...	...	...	...
ONEIDA	7,942	12	....	0	0	6	...	...	...	...
Hamilton	3,744	6	....	0	0	1	...	...	...	...
Cazenovia	3,830	9	....	0	0	5	...	...	...	...
Canastota	3,300	1	....	0	0	1	...	...	...	...
Norwich	5,766	14	....	1	0	5	...	...	...	...
Oneonta	7,147	15	....	0	0	6	...	...	...	...
Worcester	2,409	2	....	0	0	1	...	...	...	...
Cooperstown	2,368	7	....	3	0	2	...	...	...	...
Walton	4,869	3	....	2	0	1	...	...	...	...
Delhi	3,243	2	....	0	0	0	...	...	...	...
Liberty	4,568	8	....	1	0	3	...	...	...	...
Rest of District	225,540	323	18.0	30	6	141	1	2	...	...
WEST CENTRAL DISTRICT. Totals	320,600	492	19.0	32	11	199	...	9	2	...
AUBURN	35,000	39	16.6	2	1	10	...	2	...	...
ITHACA	13,136	26	24.0	3	2	2	...	2	...	...
Hector	4,137	4	....	0	0	0	...	...	...	...
Waterloo	4,256	7	....	0	0	2	...	...	...	...
Seneca Falls	6,519	12	....	0	0	4	...	...	...	...
GENEVA	10,433	15	....	0	1	4	...	1	1	...
Canandaigua	6,151	17	....	3	0	4	...	...	...	...
Manchester	4,733	12	....	0	0	6	...	...	...	...
Phelps	4,788	5	....	1	0	3	...	...	...	...
Penn Yan	4,650	8	....	0	1	5	...	...	...	...
Batavia	9,180	13	....	0	0	8	...	...	...	...
Dansville	3,633	8	....	1	0	3	...	...	...	...
Le Roy	3,144	2	....	0	0	0	...	...	...	...
Warsaw	4,341	5	....	0	0	1	...	...	...	...
Rest of District	206,500	319	19.0	22	6	147	...	4	1	...
LAKE ONTARIO AND WESTERN DISTRICT. Totals	910,200	1,217	16.5	127	81	328	5	18	...	...
BUFFALO	380,000	457	15.0	54	42	82	2	5	...	...
TONAWANDA	7,421	8	....	2	0	3	...	...	...	...
Amherst	4,223	3	....	1	0	1	...	...	...	...
NORTH TONAWANDA	9,069	13	18.0	3	2	1	1	...	...	...
LOCKPORT	16,581	23	17.5	3	0	7	...	...	...	...
NIAGARA FALLS	20,000	33	21.0	6	4	4	...	6	...	...
Medina	4,716	7	....	0	0	3	...	...	...	...
Albion	4,477	......	....	......	......	......	...	...	...	...

FOR FEBRUARY—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
8			1		2	1	1	1	1	6		2	1			2		5
					2	1	2	3		2		5	2	2	2	3		4
				1		1	1					1	1			1		
						1						1	5		1	1		2
	2	1	2	4		19	45	12	4	27	26	62	50	13	15	36	9	22
1		2	1	1		38	89	27	3	25	51	76	78	19	32	53	34	54
1		1				11	29	8	2	8	23	16	14	3	10	11	9	20
												1	1					1
								1				1	1		3	1		
						1	2			1		1				1		
							1					1	1					
						1	1	1		1	3		1		1	2	1	
							3			1	1						1	
						1					1	4	2				1	
												1						
							1	1			4	1		3		1	1	2
						2	3					1	1		4	2	2	
											1		1					
							3					1						3
											1							2
															1		1	
						2	1					1	1			1	1	1
		1	1	1		20	45	16	1	14	17	47	55	13	13	34	17	25
3		5		4	2	33	50	24	5	26	29	68	80	19	30	56	17	30
					1	2	5		1	2	2	5	5	2	4	3	4	1
1						1	5	3	1	1	3	2		2		1	1	3
						1	1	1					1					
							1	1		1			2		1		1	
						2	3	3		1		1	1		1			
						1				1	1	2	2		2	3		1
						2	2	1		2		4		1	1	1		3
						2	1	2		1			2		2	2		
								1				1	2			1		
							4			2		1				1		
1						2	1	1			1	2	1		1	2		1
				1			2				1		1			1		2
						1						1						
										1		1	1	1		1		
1		5		3	1	19	25	11	3	14	21	48	62	13	18	40	11	19
8	1	6	6	37	15	104	130	72	13	71	68	159	157	60	53	93	58	83
2	1	4	1	9	11	45	44	31	2	29	25	54	63	21	23	31	22	32
		1				1		1		1	1	1			1			1
								1								1		1
				1		1	3		1				2		2			2
				2		1	1			1	1	5	3	1		3	1	4
			2	1	2	3	2		1	1		2	3	1	4		1	4
						1					1		2			3		

MONTHLY BULLETIN

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*).										
Brockport	3,400	3	....	0	1	2	...	...	...	...
ROCHESTER	165,000	262	19.4	29	18	64	1	2	...	...
Palmyra	3,758	3	....	0	0	1	...	...	...	...
Newark	4,578	9	....	0	0	5	...	...	...	...
Lyons	5,824	13	....	0	0	6	...	...	...	...
Clyde	2,507	7	....	0	1	3	...	1	...	...
OSWEGO	22,200	47	26.6	0	3	12	...	...	...	...
FULTON	8,734	12	....	0	0	7	...	...	...	...
Richland	3,535	4	....	0	0	3	...	...	...	...
Rest of District	244,184	313	16.0	29	10	124	1	4	...	...
Totals for the State	7,735,000	12,749	20.7	1,782	1,174	2,421	48	145	9	1
Average for past five years	....	10,875	18.6	......	*2,733	2,185	42	130	14	15

* All deaths under 5 years of age.

REMARKS—In all parts of the State the mean temperature for the month was seven degrees below the average of the past 30 years, the region of Albany being the lowest with eight days on which there was registered temperatures below zero. The average lowest temperature for the State was five degrees below zero. This cold weather was accompanied in the eastern part of the State by clear, bright weather, half the days of the month being bright and sunshiny; there was deficiency of precipitation likewise in the east, while in Buffalo, Rochester and Oswego there were 26 days on which there was a trace of precipitation.

THE FEBRUARY MORTALITY—The most notable fact connected with the mortality of the month is the large number of deaths that have been reported, there having been an average of about 440 deaths a day. For the year 1903 there was an average of but 350 deaths per day. We have no February mortality which equals this, and it exceeds by almost 2,000 the average of the past five years. It likewise exceeds the mortality of January, which was itself a month of excessive death rate, by 500, or to place them on the same basis, by a daily rate of 440 deaths against 400. At the present rate there would be 160,800 deaths in the year, or 44,000 more than occurred in 1903; and taking the two months of January and February the rate for the year would exceed that of last year by 26,000.

Compared with last month the urban death rate for the entire State is 22 per thousand population, annually, against 20, and the rural death rate is 20 against 16; the total rate being 20.7 against 18.7. The deaths of early life, both under the age of one year and between one and five years, are relatively the same in both months; but at age of seventy and over there were relatively fewer deaths.

From epidemic diseases there were about the same number of deaths in both months, both as a whole and in detail, which indicates a little increase in February; the only material increase has been in deaths from typhoid fever. The percentage of deaths from epidemic diseases is, however, less this month, showing a relative increase in deaths from other causes.

PNEUMONIA is the cause of the chief increase in mortality. There were 1,820 deaths against 1,500 in January, or 14.3 per cent. of the total deaths against 12.3 per cent. With the exception of the Hudson Valley district, which shows no increase over last month, there has been a large increase in deaths from pneumonia in all parts of the State. (It may be of interest to note in this connection the meteorological data which shows for the eastern part of the State uniform cold weather with an unusual number of clear, sunshiny days and high range of barometer.) In none of the sanitary districts were less than 10 per cent. of the deaths from pneumonia, New York city having 16 per cent. of its deaths from this cause, an increase from 14 in January. In the year 1903 pneumonia caused 8 per cent. of the deaths.

Consumption does not show an increase, but is rather diminished, relatively, as but 9.2 per cent. of all deaths were from it, against 9.7. All of the sanitary districts show this relative decrease, which is very marked in the Hudson Valley district.

FOR FEBRUARY—(*Concluded*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
							2			1								
5				16		19	28	21	4	13	15	37	27	15	7	15	17	20
												1	1		1			
		1					1				3		1			1	1	1
						1	2					2	3		1	1	2	1
				2			1					1		1			1	
			1	1		5	10	1		5	2	6	2	3	4	5	1	1
						1	2				1	3	1	1		2	1	
													1	1	1	1		
1			2	5	2	26	34	17	5	20	19	47	48	16	9	30	11	16
149	94	54	37	305	207	1,179	1,821	1,002	143	606	1,014	1,350	1,239	442	570	542	542	1,250
117	100	45	70	277	161	1,132	.....	†2,272	94	614	830	1,082	1,134	378	460	536	.....	‡1,372

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

Acute respiratory diseases other than pneumonia (for the most part bronchitis and broncho-pneumonia) have a decreased mortality from January in the Maritime district, but elsewhere show little variation, and the total for the State is relatively the same in both months.

The mortality from other local diseases, of the digestive, urinary, circulatory and nervous systems, shows no material variation. There was an increase in the number of deaths from general diseases other than those specified and also in the unclassified causes of death.

GRIPPE has been pursuing an epidemic during these two months and is still in progress through March. How far it has entered into the mortality of the month is a matter of estimate. In 5,000 deaths returned direct to this office there were only 250 certificates on which this was given as in any way contributory to the mortality, or but half of one per cent. Without doubt it contributed to the unusual mortality of these months to a much greater degree than this, an analysis of which will be made later in the present epidemical prevalence.

An epidemic of typhoid fever developed in Watertown in January and has continued to the present time, through March, about 600 cases having occurred with 48 to the present time, contributing largely to the increase in the mortality of this month from this cause. It was traced readily to the water supply, which is an untreated, sewage-bearing stream and has for years past placed this city in the list of places of high typhoid fever mortality. A public water supply of this sort is always an exceedingly costly one at the best, and especially so when a great outbreak, to which it constantly exposes the place which employs it, comes into existence.

Health officers are requested to keep a closer report of cases of typhoid fever than is called for by our monthly contagious disease card. It is desired that reports be made as they occur from time to time in their municipalities. A card for this purpose, similar to our smallpox, diphtheria and scarlet fever card, is being prepared for this purpose, together with a typhoid fever leaflet of instructions.

SMALLPOX exists in 47 municipalities in this State (at the end of March), in the counties of Cattaraugus, Chautauqua, Cayuga, Chemung, Cortland, Delaware, Erie, Essex, Genesee, Herkimer, Niagara, Oneida, Onondaga, Ontario, Orange, Orleans, Otsego, Rockland, Saratoga, Steuben, Tioga, Tompkins, Washington, Wayne and Westchester. The widest distribution is in Cattaraugus county, where 6 towns are still having it; 4 in Chautauqua, 3 in Cayuga, 3 in Niagara, 3 in Steuben, 4 in Tioga, 3 in Washington county. The rest have but one affected town, some of which have but one or two cases. The first two counties named have had smallpox a long time and in them it is abating. The disease is generally less active than a month ago. There is no question of the nature of the disease, but it has been so mild that not a few cases escaped detection. There was but one death from this cause during the month of February, in Brooklyn.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following
during Ma

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under one year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebrospinal meningitis.	EPIDEMIC: Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT.										
Totals	4,158,600	8,257	23.4	1,399	880	958	78	46	9	1
CITY OF NEW YORK.										
Totals	3,838,024	7,684	23.6	1,312	858	811	74	43	9	1
BOROUGH OF MANHATTAN	1,940,121	4,413	26.0	846	523	367	55	19	3	...
BOROUGH OF THE BRONX	294,939	530	21.2	70	60	54	1	3	...	...
BOROUGH OF BROOKLYN	1,334,952	2,345	20.6	341	245	316	18	20	4	1
BOROUGH OF QUEENS	193,494	257	16.6	38	20	48	...	1	2	...
BOROUGH OF RICHMOND	74,158	139	22.2	17	10	26	...	...	...	...
Oyster Bay	16,334	18	....	1	0	9	...	...	...	...
Hempstead	27,066	53	23.1	9	2	18	...	1	...	...
North Hempstead	12,048	29	....	4	1	5	...	...	...	...
Southold	8,301	9	....	0	0	5	...	...	...	...
Sag Harbor	3,500	5	....	1	0	3	...	...	...	...
Huntington	9,483	19	....	3	0	8	...	...	...	...
Brookhaven	14,592	23	....	2	0	10	...	...	...	...
YONKERS	50,000	84	19.8	20	3	12	3	...	...	...
Greenburgh	15,564	20	....	2	0	4	...	1	...	...
MOUNT VERNON	20,346	39	22.6	7	2	6	...	...	...	...
Port Chester	7,440	9	....	2	0	2	...	...	...	...
Ossining	7,939	8	....	0	0	2	...	...	...	...
NEW ROCHELLE	14,720	24	....	6	2	5	...	...	...	...
Peekskill	10,358	14	....	3	0	3	...	...	...	...
White Plains	7,900	21	....	4	2	5	...	1	...	...
Rest of District	95,000	198	24.8	13	10	50	1	...	...	...
HUDSON VALLEY DISTRICT.										
Totals	696,000	1,399	23.7	152	67	352	3	44	...	...
ALBANY	100,000	212	25.0	21	8	51	2	1	...	...
COHOES	24,000	66	31.8	10	9	3	...	8	...	...
TROY	75,057	151	23.7	16	8	26	...	6	...	...
WATERVLIET	14,321	28	24.0	2	0	4	...	4	...	...
Green Island	4,770	4	....	1	0	2	...	...	...	...
Hoosick Falls	5,671	10	....	2	0	2	...	...	...	...
RENSSELAER	7,466	19	....	4	1	4	...	...	...	...
Coxsackie	4,102	9	....	1	0	2	...	1	...	...
Catskill	5,486	10	....	2	0	2	...	4	...	...
HUDSON	9,528	39	....	8	3	4	...	3	...	...
KINGSTON	24,535	40	19.2	7	2	5	...	...	...	...
Ellenville	3,000	11	....	0	1	6	...	1	...	...
Marbletown	3,511	9	....	1	1	1	...	...	...	...
Rosendale	6,278	7	....	1	3	0	...	...	...	...
Esopus	4,907	13	....	6	0	2	...	...	...	...
Saugerties	3,700	8	....	0	0	2	...	1	...	...
POUGHKEEPSIE	24,029	81	....	14	2	15	...	8	...	...
Fishkill	13,016	31	....	5	1	6	...	...	...	...
Wappingers Falls	3,504	3	....	1	0	1	...	...	...	...
NEWBURG	25,000	53	25.0	3	3	8	...	1	...	...
Port Jervis	9,385	26	....	2	3	3	...	...	...	...
MIDDLETOWN	14,522	28	....	2	2	5	...	...	...	...
Warwick	6,403	8	....	0	2	2	...	...	...	...
Goshen	4,564	11	....	2	2	3	...	...	...	...

DEPARTMENT OF HEALTH—VOLUME XX.

dis'ricts, cities, villages and towns in the State of New York
rch, **1904.**

in roman type. Population estimated to date printed in full face figures.]

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years.)	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
116	**130**	**40**	**25**	**197**	**142**	**927**	**1,316**	**748**	**87**	**404**	**647**	**697**	**637**	**252**	**341**	**155**	**328**	**934**
114	**128**	**37**	**23**	**190**	**139**	**869**	**1,254**	**714**	**82**	**361**	**601**	**629**	**553**	**227**	**313**	**129**	**306**	**888**
57	77	24	13	109	85	401	715	477	54	233	310	332	318	146	203	77	165	540
16	14		2	17	6	149	63	31	4	13	28	35	29	11	23	23	28	47
39	36	12	7	49	42	273	396	187	23	102	220	222	170	61	72	35	95	261
2		1	1	14	5	31	49	1	1	10	24	32	24	6	10	4	18	21
	1			1	1	15	31	18		3	19	8	12	3	5	3		19
				1	1	5	1	1				2	4			2	1	
			2			4	10	5		4	5	4	7	2	2	1		6
						2	4	1	1	8	1	3	1		1		4	3
							1	1				3	3					1
										1	1	1	1					1
							1	2		1	1	7	2			1		4
						1	2		1	2	3	1	4		3	5	1	
				1	1	7	14	4		3	8	14	6	5	8	1	2	7
				1		2		2				2	4	2	3			3
1				2	1	2	1	1	1	5	5	4	5	1	3	2	2	3
								1		2	1	1			1			3
						1			1	1		1	1	1		1	1	
1		1				1	1	5		1	3	2	4	1		1		3
						1	2			1	1	1	2		1	1	1	3
		1				2	1	4		3			6	1	1			1
	2	1		2		30	24	7	1	11	17	22	34	12	5	11	10	8
7	16	5	5	11	12	141	159	76	16	81	106	183	174	53	60	73	48	126
2			1			25	22	13	5	19	28	35	21	3	5	10	13	7
				3	1	5	8	4		3	5	4	11	2	2	1	2	7
1		1			1	17	21	10		8	11	24	11	5	3	6	5	21
						2	9	3		2	2	1	3		1		1	
						1						1	1					1
						2	1	1		1			3					2
					1	2	2	1			1	1	4		1	1		5
							1	1	1	2	1					2		
													4			1		1
						3		3	1	1		4	4	3	2	1	4	10
1				1	1	4	4	2	1	3	2	6	6	2	1	1		5
					1		2					1	2	2		1	1	
	2					3						1	2	1				
	2						1			1			1					2
	1						2					3		1				6
						1						1	2	1	1	1		
	2				4	6	8	1	2	8	7	2	15	3	3	5	2	5
						7	2			2	1	1	6		4	3	1	4
											1		1			1		
	1			2		7	5	2		4	5	4	6	7	2	1	5	1
				1		3	4	1		1	2	3	3	1	1	2	2	2
		1		1		1	3	1		3	2	5	3		4		1	3
										1		2			2	1	1	1
						1	3			1	2		2	1	1			

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT—(*Con.*)										
Montgomery	5,939	16	....	3	0	7	...	...	...	...
Haverstraw	9,874	13	....	1	1	1	...	1	...	...
Nyack	4,275	2	....	0	0	0	...	...	...	...
Ramapo	7,502	13	....	2	1	5	...	...	...	...
Rest of District	271,800	478	21.1	35	14	180	1	5	...	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	614	18.0	.78	22	194	5	25	...	...
WATERTOWN	21,700	49	26.5	4	1	10	1	18	...	...
Ellisburgh	3,888	5	....	1	0	2	...	...	...	...
Cape Vincent	2,882	6	....	0	1	2	...	...	...	...
Clayton	4,313	1	....	0	0	0	...	...	...	...
OGDENSBURG	12,633	17	....	2	0	6	...	...	...	...
Gouverneur	6,000	8	....	1	0	2	...	...	...	...
Potsdam	3,843	5	....	0	0	0	...	...	...	...
Canton	6,387	9	....	2	0	3	...	...	...	...
Malone	5,935	20	....	4	0	2	2	...	...	...
PLATTSBURG	8,434	21	....	2	2	2	...	...	...	...
Glens Falls	12,613	30	....	4	2	6	...	...	...	...
Whitehall	4,377	5	....	1	1	2	...	...	...	...
Fort Edward	5,216	8	....	0	0	1	...	...	...	...
Sandy Hill	4,473	9	....	0	0	2	...	...	...	...
Granville	5,217	8	....	1	1	1	...	1	...	...
Greenwich	4,172	4	....	1	0	1	...	...	...	...
Lowville	3,746	8	....	1	0	5	...	...	...	...
Rest of District	279,000	401	16.4	54	14	147	2	6	...	...
MOHAWK VALLEY DISTRICT Totals	420,000	697	19.5	92	30	204	5	7	...	...
SCHENECTADY	50,000	86	20.2	24	11	9	1	...	...	...
Cobleskill	3,973	8	....	1	0	4	...	...	...	...
AMSTERDAM	20,929	41	23.0	12	4	8	...	...	...	...
Fort Plain	2,444	5	....	0	0	2	...	...	...	...
JOHNSTOWN	10,130	11	....	2	2	5	...	...	...	...
GLOVERSVILLE	18,349	31	....	2	1	10	...	...	...	...
LITTLE FALLS	10,381	11	....	1	0	3	...	...	...	...
Herkimer	5,555	9	....	1	0	1	...	1	...	...
Ilion	5,138	7	....	1	1	1	...	...	...	...
UTICA	56,383	103	21.3	14	1	22	...	1	...	...
Whitestown	6,235	7	....	1	0	3	...	...	...	...
ROME	15,343	26	....	2	0	2	...	...	...	...
Boonville	3,332	4	....	0	0	3	...	...	...	...
Camden	3,745	3	....	0	0	1	...	...	...	...
Waterford	6,157	9	....	0	0	4	...	...	...	...
Mechanicville	4,695	9	....	4	0	1	...	...	...	...
Ballston Spa	3,923	5	....	0	0	3	...	...	...	...
Saratoga Springs	12,409	32	....	2	1	7	...	...	...	...
Rest of District	183,250	290	18.0	25	9	115	4	5	...	...
SOUTHERN TIER DISTRICT Totals	433,000	731	20.0	81	31	262	1	7	...	...
BINGHAMTON	40,000	79	23.0	10	7	22	...	1	...	...
Owego	5,039	8	....	3	0	1	...	...	...	...
Candor	3,330	4	....	0	0	1	...	...	...	...
Waverly	4,500	6	....	1	0	2	...	...	...	...
ELMIRA	35,672	67	22.0	5	3	17	1	2	...	...

for March—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years.)	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
			2			1	3	2				5	2					1
	2					1	3		1	1	1		1				1	1
											1							1
						1	3	2			2		2	1	1			1
3	6	3	2	3	3	48	52	29	5	20	32	79	58	20	26	35	9	39
		6	4	6	3	63	48	25	7	28	36	89	84	19	19	54	20	73
		1			2	1		1		2	2	6	4		3	2	2	4
													4					1
						2				1		1	1	1				
												1						
						2	1			2	5	1	2	1		3		
										1		2		2				3
						1	1					1	2					
		2									1	1	2	1		1		1
								1		1	2	4	4	1		1	1	3
						1	1	1		1	2	5	6		1		1	2
				1	1	2	2	1	1	2	1	2	5	3		2	3	4
			1			1							2			1		
						1	1	2				1	2					1
			1			3	1			1		2				1		
						2	1				2							2
							2					1					1	
								1			1	1	2		1	1	1	
		3	2	5		47	38	18	6	17	20	60	48	10	14	42	1	52
3		4	7	6	2	52	85	34	7	42	41	92	102	27	37	65	16	63
1			2			6	8	4	1	8	2	9	18	1	5	2	1	17
						2				1			2			3		
		1			1	2	5	5	1	7	1	2	6	1		3	1	5
										2			1	1	1			
						1	1				1	1		2		2		3
			1			1	2	6	1		2	3	7	1	1	2	2	2
						1	2				1	4	1			1		1
								1			2	2	2		1			
			1				2			1			1				1	1
1			1	1		10	17	3		4	8	16	14	4	8	5	2	8
		1				1	2		1						1	1		
						6	7			1		2	2	2	2	1		2
							1						1	1		1		
										1		1	1					
						2	3				1		1			2		
							2	2			2	1			1			1
											1		2			1		1
						3	4	2		3	4	2	1	1	3	5	1	3
1		2	2	5	1	17	29	11	3	13	16	49	42	13	14	36	8	19
9	18	4	3	6	3	52	100	45	7	38	37	77	87	29	39	80	36	53
	7				1	8	9	3		9	4	4	11	3	2	8	4	5
								1	1			1				1		4
												2		1		1		
	1								1			1		1		2		
						8	10	4		3	7	2	17	3	2	3	2	3

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*)										
Horseheads	5,000	5	...	2	0	3	...	...	...	...
HORNELLSVILLE	12,000	23	...	3	2	6	...	...	...	...
Bath	5,000	8	...	0	1	1	...	1	...	...
CORNING	11,061	21	...	4	0	6	...	...	...	...
Wellsville	5,000	9	...	2	0	0	...	...	...	...
OLEAN	9,462	14	...	0	0	3	...	...	...	...
Salamanca	4,251	7	...	0	1	0	...	...	...	...
DUNKIRK	15,000	38	...	14	3	6	...	...	...	...
JAMESTOWN	22,892	27	14.0	3	0	6	...	...	...	...
Westfield	2,430	...	...	...	...	...	...	...	...	...
Fredonia	4,125	10	...	4	0	4	...	1	...	...
Rest of District	248,600	405	19.2	30	14	184	...	2	...	...
EAST CENTRAL DISTRICT Totals	404,500	693	20.0	64	20	255	3	11	...	...
SYRACUSE	110,000	171	18.0	24	5	35	...	4	...	...
Baldwinsville	3,000	8	...	1	0	1	...	...	...	...
DeWitt	5,435	7	...	0	0	2	1	1	...	...
CORTLAND	9,014	15	...	4	0	6	...	...	...	...
Homer	2,381	...	...	...	...	...	...	...	...	...
ONEIDA	7,942	11	...	1	0	2	...	...	...	...
Hamilton	3,744	8	...	0	1	3	...	...	...	...
Cazenovia	3,830	4	...	0	0	2	...	...	...	...
Canastota	3,300	7	...	1	0	2	...	...	...	...
Norwich	5,766	9	...	0	0	3	...	...	...	...
Oneonta	7,147	17	...	1	0	6	...	...	...	...
Worcester	2,409	9	...	1	0	3	...	...	...	...
Cooperstown	2,368	7	...	2	0	4	...	...	...	...
Walton	4,869	5	...	1	0	3	...	1	...	...
Delhi	3,243	2	...	0	0	0	...	...	...	...
Liberty	4,568	10	...	1	0	2	...	...	...	...
Rest of District	225,540	403	20.7	27	14	181	2	5	...	...
WEST CENTRAL DISTRICT Totals	320,600	537	19.7	42	8	241	3	3	...	...
AUBURN	35,000	65	21.9	11	3	19	1	...	...	...
ITHACA	13,136	25	23.0	2	0	8	...	...	...	...
Hector	4,137	9	...	0	0	5	...	...	...	...
Waterloo	4,256	6	...	1	0	3	...	...	...	...
Seneca Falls	6,519	11	...	0	0	3	...	...	...	...
GENEVA	10,433	16	18.5	1	0	7	...	...	...	...
Canandaigua	6,151	14	...	4	0	6	...	...	...	...
Manchester	4,733	4	...	1	0	1	...	...	...	...
Phelps	4,788	7	...	0	0	4	...	...	...	...
Penn Yan	4,650	10	...	1	1	3	1	...	...	...
Batavia	9,180	9	...	1	0	3	...	...	...	...
Dansville	3,633	8	...	0	0	6	...	...	...	...
Le Roy	3,144	11	...	0	1	4	...	...	...	...
Warsaw	4,341	7	...	0	0	4	...	...	...	...
Rest of District	206,500	335	19.0	20	3	165	1	3	...	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	910,200	1,375	18.0	208	65	362	7	20	1	...
BUFFALO	380,000	500	15.5	92	24	97	4	2	...	...
TONAWANDA	7,421	8	...	1	0	1	...	1	...	...
Amherst	4,223	10	...	1	0	5	...	1	...	...
NORTH TONAWANDA	9,069	16	...	9	1	2	...	1	...	...
LOCKPORT	16,581	27	20.0	7	1	8	...	1	...	...

FOR MARCH—(*Continued*).

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
DISEASES.						OTHER CAUSES OF DEATH.												
...	...	...	1	...	...	...	1	...	...	...	...	1	...	...	...	1	...	1
...	1	...	...	1	...	2	2	2	...	2	1	4	...	...	4	1	2	1
...	...	...	...	...	...	...	1	1	...	1	...	...	...	...	4	...	...	...
1	...	...	...	2	...	2	3	2	...	2	...	1	3	1	2	2	...	...
1	...	...	...	...	...	...	1	2	...	...	...	1	...	...	1	...	...	3
...	...	...	...	...	...	2	1	1	1	...	2	1	3	...	1	...	1	1
...	...	...	...	...	...	...	1	1	...	...	1	1	1	...	1	...	1	...
6	...	...	...	...	...	5	4	2	1	4	...	3	3	1	...	3	1	5
...	...	...	...	2	...	2	2	...	...	2	2	2	4	1	1	2	5	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	1	...	...	...	1	...	...	1	...	1	...	...	...	3	1	1
1	9	4	1	1	2	23	64	26	3	14	20	52	45	18	21	53	19	27
4	...	4	1	3	4	54	98	22	7	46	54	84	88	24	28	68	32	58
4	...	2	...	...	3	21	23	1	1	20	16	19	11	2	6	8	10	20
...	...	...	...	...	...	2	...	1	...	2	2	1	...	...	...	...	...	...
...	...	...	...	...	...	2	...	...	...	...	1	...	1	...	...	1	...	...
...	...	...	...	...	...	2	1	...	...	...	1	2	4	...	1	2	...	2
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	2	2	...	...	2	...	1	2	...	...	1	...	1
...	...	...	...	1	...	...	2	...	...	...	...	...	1	...	2	1	1	...
...	...	...	...	...	...	...	1	...	...	...	...	...	1	1	...	1	...	...
...	...	...	...	...	...	...	5	...	...	...	1	...	1	...	...	...	...	...
...	...	...	...	...	...	2	1	...	...	...	...	2	...	1	...	1	2	...
...	...	...	...	...	...	1	3	...	1	2	1	1	...	1	...	1	3	3
...	...	...	...	...	...	...	3	...	...	1	...	2	2	...	...	1	...	...
...	...	...	...	...	1	...	...	...	...	...	...	1	1	2	...	...	...	2
...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	1	1	...	...
...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...
...	...	...	...	...	...	5	...	...	...	...	...	1	...	...	1	2	...	1
...	...	2	1	2	...	17	56	19	5	19	31	53	64	17	17	48	16	29
...	2	2	2	2	2	29	84	25	2	33	37	81	83	18	21	62	26	20
...	...	...	...	...	1	4	11	2	1	5	2	10	10	6	...	5	3	4
...	1	...	...	...	...	2	4	1	...	1	4	1	2	1	2	1	2	3
...	...	...	...	...	...	...	1	2	...	1	2	1	...	...	1	...	1	...
...	...	...	...	...	...	1	1	...	...	...	...	3	1	...	...	...	...	...
...	...	...	...	...	...	1	4	...	...	...	2	2	...	...	...	...	2	...
...	...	...	...	...	...	...	2	3	...	2	...	3	1	1	1	2	...	1
...	...	...	1	...	1	...	2	1	...	...	...	2	1	...	1	2	2	1
...	...	...	...	...	...	1	...	1	...	...	...	1	1	...	...	...	...	...
...	...	...	...	...	...	...	2	...	...	2	...	1	...	1	...	...	1	...
...	...	...	...	...	...	2	4	...	...	1	...	2	...	...	...	...	...	...
...	...	...	...	...	...	1	2	...	...	...	...	...	2	1	1	2	...	...
...	...	...	...	...	...	...	2	...	...	1	...	2	...	...	1	2	...	...
...	...	...	...	...	...	1	2	1	...	1	...	2	2	...	...	2	...	...
...	...	...	...	...	...	...	...	...	...	2	...	1	2	...	...	2	...	...
...	1	2	1	2	...	16	47	14	1	17	27	50	61	8	14	44	15	11
13	2	8	3	21	14	114	121	97	11	85	82	150	194	70	74	103	66	119
2	...	2	...	4	7	45	36	44	4	24	33	47	76	33	30	32	27	48
...	...	...	...	...	...	...	1	...	...	...	...	1	1	...	...	1	2	1
...	...	...	...	...	...	...	1	...	1	...	...	...	2	...	...	3	1	1
...	...	...	...	...	...	2	...	...	...	...	...	...	2	2	1	1	...	7
...	...	...	...	1	1	3	1	3	...	4	3	1	...	...	2	3	...	4

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Con.*)										
NIAGARA FALLS	20,000	45	27.0	9	6	7	...	6	...	...
Medina	4,716	5	....	0	1	0	...	...	...	...
*Albion**	4,477	6	....	0	0	2	...	...	...	...
Brockport	3,400	8	....	1	1	4	...	...	...	...
ROCHESTER	165,000	264	18.8	25	14	56	...	2	1	...
Palmyra	3,758	8	....	2	0	4	...	...	...	...
Newark	4,578	7	....	0	0	3	...	...	...	...
Lyons	5,824	13	....	0	0	7	...	1	...	...
Clyde	2,507	5	....	1	0	3	...	...	...	...
OSWEGO	22,200	34	18.0	6	1	8	...	2	...	...
FULTON	8,734	11	....	1	0	1	...	1	...	...
Richland	3,535	9	....	0	0	3	...	...	...	...
Rest of District	244,184	399	19.0	53	16	151	3	2	...	...
Totals for the State	7,738,000	14,303	21.7	2,116	1,123	2,828	105	163	10	1
Average for past five years	....	11,719	18.7	......	*3,056	1,060	56	123	13	19

* All deaths under 5 years of age.

REMARKS—The month has continued to show a subnormal temperature, but not to the degree of January and February, and in the western part of the State the average temperature was above the normal. Everywhere however there has been an accumulated deficiency in temperature since the first of January, which amount to an average for the State of 431°, and was most marked in the east and north, that of the western stations being 367°. The mean temperature of the month was just at the freezing point. With the colder weather of the east there continued as in the preceding months to be more sunshiny weather, with an average of 11 days during which .01 inch of rain fell. There was slight variation from the normal in precipitation. Wind movement was generally west and northwest, with maximum velocities of from 40 to 60 miles per hour.

THE MARCH MORTALITY.—It was noted in the last BULLETIN that the number of deaths exceeded that of any on our records for February, with a daily average of 440, and an increase above the average for the five years preceding of nearly 2,000. The March mortality, however, far exceeds that of February, and the month is conspicuous in having had in the 14,300 deaths which occurred the largest number of deaths ever recorded in one month in this State. In twenty years covered by our records there have been 14 months only in which the reported number of deaths has exceeded 12,000, and four times only has the monthly mortality reached 13,000; these were in January, 1890 and 1892; April, 1891, and July, 1892. July is uniformly the month in which the greatest number of deaths occur and ordinarily there are between 11,000 and 12,000 deaths in July every year. But it is noteworthy that the periods of phenomenal mortality, when the number of deaths rises far above the ordinary for the month, occur in the winter or spring months. These extraordinary increases are mainly due to deaths from acute pulmonary diseases, which cause a far larger element of variability in mortality than do the diarrheal diseases of midsummer. In the years 1890 to 1893, in which the great monthly mortalities occurred in the winter and spring months, the deaths from acute respiratory diseases for the year arose from less than 14,000 of preceding years to between 18,000 and 20,000 deaths for the year, mortalities which have hardly ever since been reached. No other causes or groups of causes of death have shown anything like this variation.

March in our records is the second highest month of the year in the number of deaths, coming next to July. Indeed it shows an average by periods of five years but very little less, both months having an average mortality of about 11,500. In the past five years it even exceeds the July average. The predominant cause for this increase is the deaths from pneumonia and other acute respiratory diseases, the number of which is commonly greatest in March; and it often equals and frequently exceeds the diarrheal mortality of July. These are the two great causes of death having seasonal variability. In this present month there were 3,000 deaths from acute pulmonary diseases, besides 1,400 from consumption; but other local diseases are likewise much increased, deaths from old age are increased, and from conditions of general enfeeblement not classified. In the three months since January 1st almost

for March—(*Concluded*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	2	1	2	3	1	.....	3	3	1	2	.....	6	2	4	5	2	.....	2
....	...	...	...	...	.....	.....	1	1	...	.....	.....	1	1	...	...	...	1	.....
....	...	...	...	...	.....	2	1	1	...	.....	1	.....	.....	...	...	...	.....	1
....	...	...	...	1	.....	1	.....	.....	...	.....	1	1	3	...	...	...	.....	1
6	...	3	...	7	.....	26	22	23	2	18	23	39	37	11	9	7	16	12
....	...	...	...	...	1	.....	.....	.....	...	.....	.....	.....	5	...	...	1	.....	1
....	...	...	...	...	.....	1	.....	.....	...	.....	.....	3	.....	...	1	2	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	1	.....	1	1	1	...	6	2	.....
....	...	...	...	...	.....	1	.....	1	...	.....	.....	1	.....	...	...	1	.....	1
....	...	2	...	...	.....	2	5	.....	1	2	2	2	4	1	4	1	.....	6
....	...	...	...	...	.....	4	1	.....	...	.....	.....	1	.....	1	...	1	.....	2
....	...	...	...	...	.....	1	.....	.....	...	1	.....	2	.....	...	1	3	.....	1
5	...	...	1	5	4	27	49	21	2	33	18	44	60	17	21	39	17	31
152	168	73	50	252	182	1,432	2,011	1,072	144	757	1,040	1,453	1,449	492	619	660	572	1,446
125	114	52	87	267	191	1,287	.....	†2,372	120	662	906	1,155	1,250	431	458	537	.....	‡1,494

†Includes all acute respiratory diseases. ‡ Includes the preceding column.

40,000 deaths have occurred, or 5,000 above the average, all this period being one of excessive mortality. There are customarily more deaths in the first quarter of the year; of 1,000 deaths occuring during the year, 265 will occur in the first three months, 245 in the second, 260 in the third and 230 in the fourth. (The mortality of December is variable but will not usually be far from that of September.)

The Epidemic Mortality is relatively low, 8 per cent. of the total. The typhoid fever deaths are increased a little from its unusual pervalence in a number of places; the Watertown outbreak has abated. There is a considerable increase in the deaths from cerebrospinal meningitis, which comes largely from the city of New York. Scarlet fever has increased during the last four months and its prevalence is noted at Dunkirk, Niagara Falls, Phillipstown, White Plains, Saugerties and towns in Schoharie and Sullivan counties. Measles causes more deaths at this time of the year and it shows a moderate though widespread prevalence. Diphtheria decreases as is usual in March.

Smallpox has decreased in prevalence; during April, 40 cases have been reported from the following places: Buffalo, Lockport, Medina, Hinsdale, Auburn, Ithaca, Scriba, Tompkins, Delaware county, and Stony Point, more than half of the number occuring in the last mentioned, where there has been a recent outbreak. Chautauqua county, where smallpox has been long prevalent, appears to be clear, and in Chautauqua county but a single town is affected as reported. Undiscovered cases in Tompkins, Delaware county, caused a spread to adjoining towns. The discovery of occasional cases the origin of which has not been accounted for indicates the existence of undetected cases. There have been but 5 deaths during the year, 3 of which occurred in Brooklyn.

What Constitutes Vaccination is a question sometimes asked, and it is important since not unfrequently cases of smallpox are reported where vaccination has been said to have been performed even within a few months. A person cannot be said to have been vaccinated in whom the disease vaccinia has not been induced; in the intent of the law as well as for scientific reasons one cannot be considered to be vaccinated on whom simply the procedure of vaccination has been performed without subsequent result. The purpose of the procedure is to secure protection from smallpox, and that is only effected by its resulting in the production of vaccinia, with all its normal phenomena of soreness at the site of introduction of the virus sequent in its evolution upon an interval of two or three days after the operation, and the orderly development of subsequent usual symptoms, local and constitutional, of this slight disease. Everyone who has not been at some previous time successfully vaccinated or who has not had smallpox should have this vaccinia as a result of the operation of vaccination, for the term implies not merely the procedure of inoculation with the virus, but the expected subsequent results. It is well proven that persons on whom vaccination fails are not immune to smallpox nor safe from taking it if exposed. A certificate of protection against smallpox ought only to be given after the vaccination has worked; that is, has been found to cause vaccinia.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Ap

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT										
Totals	4,158,600	8,346	24.2	1,311	1,170	823	223	36	7	...
CITY OF NEW YORK										
Totals	3,838,024	7,792	24.6	1,233	1,134	699	218	28	6	...
BOROUGH OF MANHATTAN	1,940,121	4,437	27.0	762	691	317	158	12	1	...
BOROUGH OF THE BRONX	294,939	525	21.6	62	64	48	13	...	3	...
BOROUGH OF BROOKLYN	1,334,952	2,440	22.2	350	341	285	42	13	2	...
BOROUGH OF QUEENS	193,494	267	16.8	47	27	26	3	1	...	...
BOROUGH OF RICHMOND	74,158	123	19.7	12	11	23	2	2	...	...
Oyster Bay	16,334	28	....	7	1	5	1	...	...	...
Hempstead	27,066	37	....	8	1	13	...	1	...	...
North Hempstead	12,048	24	....	1	1	8	...	...	...	...
Southold	8,301	16	....	2	0	6	...	...	...	...
Sag Harbor	3,500	5	....	1	0	1	...	...	...	...
Huntington	9,483	3	....	0	0	1	...	...	...	...
Brookhaven	14,592	12	....	1	0	4	...	...	...	...
YONKERS	50,000	101	24.4	20	16	10	4	2	...	...
Greenburgh	15,564	27	....	5	4	6	...	...	...	...
MOUNT VERNON	20,346	41	....	5	3	6	...	1	...	...
Port Chester	7,440	16	....	3	1	5	...	...	...	...
Ossining	7,939	10	....	3	0	0	...	...	1	...
NEW ROCHELLE	14,720	28	....	0	3	9	...	1	...	...
Peekskill	10,358	15	....	3	0	2	...	...	...	...
White Plains	7,900	18	....	1	1	4	...	1	...	...
Rest of District	95,000	173	22.2	17	5	44	...	2	...	...
HUDSON VALLEY DISTRICT										
Totals	696,000	1,219	20.3	145	56	334	2	32	...	...
ALBANY	100,000	185	22.5	13	4	37	...	4	...	...
COHOES	24,000	35	18.2	10	3	2	...	5	...	...
TROY	75,057	135	....	25	6	27	...	5	...	...
WATERVLIET	14,321	24	....	4	1	3	1	1	...	...
Green Island	4,770	5	....	0	0	1	...	...	...	...
Hoosick Falls	5,671	5	....	1	0	2	...	...	...	...
RENSSELAER	7,466	28	....	6	1	2	...	2	...	...
Coxsackie	4,102	8	....	0	2	0	...	...	...	...
Catskill	5,486	9	....	1	0	3	...	1	...	...
HUDSON	9,528	29	....	3	1	3	...	6	...	...
KINGSTON	24,535	54	....	9	2	13	...	...	...	...
Ellenville	3,000	9	....	0	0	4	...	...	...	...
Marbletown	3,511	4	....	0	0	1	...	...	...	...
Rosendale	6,278	9	....	2	0	1	...	...	...	...
Esopus	4,907	6	....	0	1	3	...	...	...	...
Saugerties	3,700	8	....	0	0	5	...	...	...	...
POUGHKEEPSIE	24,029	55	....	7	3	16	...	1	...	...
Fishkill	13,016	20	....	4	1	9	...	...	...	...
Wappingers Falls	3,504	4	....	0	0	2	...	...	...	...
NEWBURG	25,000	50	....	6	3	12	...	1	...	...
Port Jervis	9,385	14	....	2	3	3	...	...	...	...
MIDDLETOWN	14,522	31	....	2	0	8	...	...	...	...
Warwick	6,403	8	....	2	1	3	...	...	...	...
Goshen	4,564	11	....	1	0	4	...	...	...	...

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York ril, 1904.

Roman type. Population estimated to date printed in full face figures.]

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
129	183	34	26	264	201	924	1,216	807	97	307	649	691	601	222	419	123	315	872
125	176	31	19	250	195	871	1,156	781	96	286	605	621	524	208	375	100	292	829
60	88	16	11	161	138	405	640	506	72	152	302	337	291	122	224	51	154	536
21	15	2		17	4	146	50	39	4	8	33	38	26	15	24	4	30	33
36	72	13	7	64	44	277	395	202	16	110	233	216	169	56	99	39	98	237
6				4	7	32	52	20	3	11	25	17	28	9	23	4	4	18
2	1		1	4	2	11	19	14	1	5	12	13	10	6	5	2	6	5
	2		2			2	3	3			1	3	2		3	2	2	2
4			1			2	6	1		2	3	5	3		1	3	2	6
					1	1	2	1		1	2	4	3	1	3	3	1	1
		1				2	4			2		3	1		1	1		1
						1				1	1					1		1
											1	1	1					
							2				1		4		4	1		
1		1	1	8	3	11	14	6		2	10	9	5	2	5		7	10
	1				1	1	3	1	1	4		5	2	1	3	1		3
2	2		2	2		5	2	4		1	1	3	4	4	6	1		1
							1	1		1	1	2	4		4			2
						2		2			1	1	2		1			
				1	1	2	5	1		1	1	4	7		3		1	
						1	2				1	3	1		1		1	5
						1	3				2	2	3		1	1	2	2
	2	1	1	3		22	13	6		6	18	25	35	6	8	9	7	9
6	21	2	6	22	10	127	130	64	6	62	90	164	171	42	44	63	52	103
1				2	2	16	25	12		12	14	25	31	9	8	2	13	9
						6	1	5		4		2	6	1			1	4
				2	1	14	23	13		9	13	14	14	1	2	4	2	18
	1	1		1	1	3	2	1			1	3	3	1			1	3
				1		2						1					1	
						1						1	2					1
2						2	4			3	1	4	3		2	1		4
						1				1	2		1				2	1
								1	1		1	2	3					
						3	4			1	1	2	4	2	1		1	4
				1	1	9	3	1		4	3	8	9	1	1	4	3	6
						3	1					1	1			2		1
	1					1	1					1						
	1					1	2	1						1				3
	1			1								1	2					1
						2	1			1	1		1		1		1	
	2					6	6	3		2	7	5	8	1	1	4	3	6
					1	2	2			1	3	2	2			3	2	2
						1	1					1					1	
	3			3		2	4	4	1	2	4	8	6	1	1	4	1	5
	2			2		2				1		3				2		2
				1		6	3	1		1	4	2	4		4	3	1	1
			2		1							1	1		1	1	1	
						2				1		3	3		1	1		

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DIST.—(*Con.*)										
Montgomery	5,939	11	....	3	0	2	...	...	...	...
Haverstraw	9,874	5	....	......	......	1	...	...	...	...
Nyack	4,275	5	....	0	0	2	...	...	...	...
Ramapo	7,502	27	....	7	2	6	...	...	...	...
Rest of District	271,800	425	19.5	37	22	159	1	6	...	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	545	16.5	78	22	169	4	12	...	...
WATERTOWN	21,700	41	22.0	14	1	6	...	4	...	...
Ellisburgh	3,888	8	....	1	0	2	...	...	...	...
Cape Vincent	2,882	1	....	1	0	0	...	...	...	...
Clayton	4,313	2	....	1	0	1	...	...	...	...
OGDENSBURG	12,633	31	....	7	1	8	...	2	...	...
Gouverneur	6,000	8	....	2	0	3	...	2	...	...
Potsdam	3,843	3	....	0	0	0	...	...	...	...
Canton	6,387	11	....	0	1	2	...	...	...	...
Malone	5,935	15	....	0	0	4	...	...	...	...
PLATTSBURG	8,434	12	....	3	1	2	...	...	...	...
Glens Falls	12,613	19	....	4	0	9	...	...	...	...
Whitehall	4,377	12	....	2	2	1	...	1	...	...
Fort Edward	5,216	12	....	1	0	7	...	...	...	...
Sandy Hill	4,473	6	....	0	0	3	...	...	...	...
Granville	5,217	5	....	0	0	3	...	...	...	...
Greenwich	4,172	7	....	1	1	1	...	...	...	...
Lowville	3,746	5	....	1	0	2	...	...	...	...
Rest of District	279,000	347	15.0	40	15	114	4	3	...	...
MOHAWK VALLEY DISTRICT Totals	420,000	611	17.7	99	24	181	1	5	...	...
SCHENECTADY	47,625	74	18.0	23	3	14	...	1	...	...
Cobleskill	3,973	4	....	1	0	1	...	...	...	...
AMSTERDAM	20,929	30	17.5	3	0	9	...	...	...	...
Fort Plain	2,444	1	....	0	0	0	...	...	...	...
JOHNSTOWN	10,130	10	....	1	0	2	...	...	...	...
GLOVERSVILLE	18,349	25	....	3	0	7	...	...	...	...
LITTLE FALLS	10,381	20	....	2	0	5	...	...	...	...
Herkimer	5,555	7	....	1	0	1	...	...	...	...
Ilion	5,138	2	....	1	0	0	...	...	...	...
UTICA	56,383	105	22.4	15	8	26	...	...	...	...
Whitestown	6,235	7	....	1	2	1	...	...	...	...
Rome	15,343	19	....	3	2	4	...	1	...	...
Boonville	3,332	10	....	2	0	5	...	...	...	...
Camden	3,745	1	....	0	0	0	...	...	...	...
Waterford	6,157	6	....	1	0	0	...	1	...	...
Mechanicville	4,695	6	....	2	0	0	...	...	...	...
Ballston Spa	3,923	3	....	0	0	3	...	...	...	...
Saratoga Springs	12,409	19	....	1	0	3	...	...	...	...
Rest of District	183,250	262	17.0	39	9	100	1	2	...	...
SOUTHERN TIER DISTRICT Totals	433,000	661	18.6	90	30	196	2	2	...	...
BINGHAMTON	40,000	89	25.0	11	6	16	...	...	...	...
Owego	5,039	4	....	2	0	1	...	...	...	...
Candor	3,330	6	....	2	0	3	...	...	...	...
Waverly	4,500	8	....	0	2	6	...	...	...	...
ELMIRA	35,672	52	18.0	10	2	14	...	...	...	...

FOR APRIL—(*Continued*).

Diseases. Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Other Causes of Death. Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
			1	4						1		1	1	1	1			1
	1										2		1					1
											1	1	1	1			1	
						6		1		2	1	4	5	3		1		4
3	9	1	8	4	3	36	47	21	3	16	31	68	59	19	20	31	17	27
		1	4	4	2	51	50	29	6	38	35	75	74	22	20	36	28	54
			1	1		2	1	3		2		6	5		1	3	2	10
						2					2	1		1		1		1
													1					
												1			1			
					1	1			1		2	9	4	2			3	6
							1			1			1			2		1
						1		1					1					
		1				1				1		1	1		1	2	3	
							1			1	3	4	3		1	1	1	
						3	2	2				1	2	1		1		
						3	4			1	3					3	2	3
			2				2	1		2	2		2					
							2				2	4	3					1
						1		1		2		1				1		
						1					2		1			1		
							1	1		1	1	1	1					1
						1		1			1			1		1		
			1	3	1	35	36	19	5	27	17	46	49	17	16	20	17	31
12		1	8	6	6	49	70	42	6	40	47	67	76	28	25	37	24	61
		1	1		2	7	10	8	2	5	4	2	6	3	5	3	2	12
						1								1	1			1
						4	4	1			3	5	5	1		3	1	3
										1								
						3	1				1	1	1		1	2		
						1	1	1		2	2	4	5	2	2		1	4
						4	4			2	1	3	3	1		1		1
						1				1		2	1		1		1	
											1							1
8			2			9	11	8	1	12	8	9	11	5	3	3	4	11
			2				2	1				1	1					
2							1	1	1	2	1	2	2			2	2	2
							1	2		1	1	1	1			2		1
															1			
											1	1	1	1			1	
							1			1							2	2
											2	1						
						2	2	1	1		3	3	2	1	2	1	1	
2			3	6	4	17	32	19	1	13	19	32	37	13	9	20	9	23
7	10	4		7	3	52	96	39	4	40	47	83	82	22	24	53	22	62
2	1			2	2	16	7	6		2	6	9	13	2	2	6	4	9
										1			1					1
							3				1		1					1
	1						1	1			2		3					
				1		6	5	6		2	2	10	5		5	3		7

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DIST.—(*Con.*)										
Horseheads	5,000	5	....	2	1	2	...	...	...	...
HORNELLSVILLE	12,000	18	....	5	0	0	...	...	...	...
Bath	5,000	4	....	1	0	2	...	...	...	...
CORNING	11,061	11	....	3	1	1	...	...	...	...
Wellsville	5,000	8	....	0	2	1	...	...	...	...
OLEAN	9,462	14	....	2	0	4	1	...	...	...
Salamanca	4,251	4	....	0	0	0	...	...	...	...
DUNKIRK	15,000	30	....	9	4	4	...	1	...	...
JAMESTOWN	22,892	31	16.5	5	0	7	...	1	...	...
Westfield	2,430	5	....	1	0	3	...	...	...	...
Fredonia	4,125	5	....	0	0	1	...	...	...	...
Rest of District	248,600	367	18.0	37	12	131	1	...	...	...
EAST CENTRAL DISTRICT Totals	404,500	540	16.3	60	21	175	3	1	...	...
SYRACUSE	110,000	149	16.5	24	8	19	1	...	...	...
Baldwinsville	3,000	1	....	1	0	0	...	...	...	...
DeWitt	5,435	6	....	1	1	2	...	...	...	...
CORTLAND	9,014	16	....	4	0	5	...	...	...	...
Homer	2,381	6	....	0	0	0	...	...	...	...
ONEIDA	7,942	10	....	0	0	3	...	...	...	...
Hamilton	3,744	4	....	1	0	1	...	...	...	...
Cazenovia	3,830	4	....	0	0	1	...	...	...	...
Canastota	3,300	5	....	0	1	1	...	...	...	...
Norwich	5,766	11	....	0	0	2	...	...	...	...
Oneonta	7,147	10	....	1	1	5	...	...	...	...
Worcester	2,409	3	....	0	0	1	...	...	...	...
Cooperstown	2,368	6	....	0	0	3	...	...	...	...
Walton	4,869	6	....	0	0	6	...	...	...	...
Delhi	3,243	3	....	0	0	2	...	...	...	...
Liberty	4,568	10	....	0	0	2	...	...	...	...
Rest of District	225,540	290	15.7	28	10	122	2	1	...	...
WEST CENTRAL DISTRICT Totals	320,600	483	18.4	43	14	177	3	9	...	...
AUBURN	35,000	50	17.3	8	6	9	1	1	...	...
ITHACA	13,136	20	....	3	1	4	...	...	...	...
Hector	4,137	5	....	0	0	1	...	...	...	...
Waterloo	4,256	8	....	0	2	1	...	...	...	...
Seneca Falls	6,519	11	....	2	0	1	...	...	...	...
GENEVA	10,433	22	....	2	0	5	...	2	...	...
Canandaigua	6,151	8	....	0	0	3	...	...	...	...
Manchester	4,733	5	....	0	0	2	...	...	...	...
Phelps	4,788	4	....	0	0	3	...	...	...	...
Penn Yan	4,650	7	....	0	0	5	...	...	...	...
Batavia	9,180	11	....	2	0	2	...	...	...	...
Dansville	3,633	1	....	0	0	1	...	...	...	...
Le Roy	3,144	2	....	0	0	1	...	...	...	...
Warsaw	4,341	5	....	0	0	0	...	...	...	...
Rest of District	206,500	324	19.1	26	5	139	2	6	...	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	910,200	1,295	17.0	205	82	325	16	7	...	...
BUFFALO	380,000	523	16.7	103	45	93	8	2	...	...
TONAWANDA	7,421	10	....	1	2	4	1	1	...	...
Amherst	4,223	2	....	0	0	1	...	...	...	...
NORTH TONAWANDA	9,069	12	....	6	1	0	...	1	...	...
LOCKPORT	16,581	24	....	2	3	8	...	...	...	...

FOR APRIL—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
							1	2		1						1		
						3	3			3	1	2	1		1		1	3
						1										2		1
						1	3			3		1	2					1
							2	1					4					1
						1	1		1		1	1	3	1	1	1		2
							1					1	1				1	
4						3	5	3		1	1	1	2	1	3	1		4
						5	2		1	2	2	8	1		1	2	1	5
														1		3	1	
						1						1	1			1	1	
1	8	4	...	4	1	15	62	20	2	25	31	49	44	17	11	32	13	27
4	5	2	...	3	1	45	51	25	5	48	35	75	69	19	26	53	24	46
2	...	1	...	2	1	14	9	10	2	16	7	20	17	4	5	7	10	21
																		1
						1	1			1						1		2
	2					3		1			1	1	3		1	1	1	2
										1		2	2				1	
						1					1	2	1	1	1	2	1	
				1			1					1		1				
						1	2			1								
						1	1	1							2			
						1	2			2		1	2		1	1	1	
								2	1			1	2		2	2		
							1				1					1		
						1					1		2	1		1		
												1	3			2		
													2		1			
						4				2	1				1	1	1	
2	3	1	...	...	...	18	34	11	2	25	23	46	35	12	12	34	9	20
1	3	5	1	5	2	37	38	22	5	30	29	87	62	19	27	44	17	37
	1	1		3		2	6	7		2	4	8	6		1	1	2	4
	1			1			3	1		1	3	5	3	1				1
											2		1				1	1
						1				1		2			1		3	
						3	1					2	1	1	2			1
						7	1			2	1	2		1	1	1	2	2
							1					3	2				2	
												2	1			1		1
								1		1					2			
						1					2	1	1			2		
						1		2		1		2			3	1		1
																1		
										1		1						
										1		1	1	1	1			
1	1	4	1	1	2	22	26	11	5	20	17	58	46	15	16	37	7	26
14	3	5	4	19	16	114	114	98	11	98	84	158	155	58	54	84	6[illegible]	118
5	3	3	1	7	11	45	44	55	...	31	32	53	62	24	30	24	2[illegible]	58
										1	1		2			2	1	1
						1										1		
1					1		1			1	1	1	1		1		1	2
				1		2	5	3	1		1	3	4		1	1	1	1

MONTHLY BULLETIN

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*)										
NIAGARA FALLS	20,000	37	23.0	7	1	6	...	2	..	...
Medina	4,716	10	....	1	0	2	...	...	...	...
Albion	4,477	8	....	0	0	4	...	...	...	...
Brockport	3,400	2	....	0	0	2	...	...	...	...
ROCHESTER	165,000	271	20.0	34	18	54	2	...	...	...
Palmyra	3,758	5	....	1	0	4	...	...	...	...
Newark	4,578	8	....	0	0	4	...	...	...	...
Lyons	5,824	10	....	2	1	2	...	...	...	...
Clyde	2,507	5	....	0	0	3	...	...	...	...
OSWEGO	22,200	42	22.0	6	0	9	...	1	...	...
FULTON	8,734	10	....	2	0	5	...	...	...	...
Richland	3,535	4	....	0	1	2	...	...	...	...
Rest of District	244,184	312	15.6	40	10	122	5	...	...	...
Totals for the State	7,738,000	13,700	21.5	2,031	1,419	2,379	254	104	7	...
Average for past five years	....	11,125	18.2	......	*2,805	1,184	60	105	16	22

* All deaths under 5 years of age.

REMARKS—There was a lower range of the barometer than in March and a more general prevalence of rainy weather and higher relative humidity, the total amount of precipitation being the same as during last month, but moderately excessive in most parts of the State as compared with the average of the past thirty years records. Sunshine and cloudiness was the same everywhere, one fifth of the days being clear and more than half cloudy. The temperature has continued as in preceding months subnormal, April having been a cold month; last year highest temperatures of 85 degrees were reached, which is 15 degrees above those of this month, the average maximum temperature which was then 56 degrees is now 49 degrees, and the average minimum 39 degrees then, 34 degrees now. Killing frosts occurred on several days, and a snow fall of 20 inches occurred in the central part of the State during the month.

THE APRIL MORTALITY—This month has generally a uniform mortality of about 10,500 in this State and is seldom subject to fluctuation. In 1900 there were 12,500 deaths, following a still higher March mortality; in 1893 there were about 12,000 deaths in the month with the same number in March; and in 1891, at the height of a grippe epidemic, there were 14,000 deaths, following a March mortality not above the normal, and exceeding the number reported for any month on our records until the phenomenal mortality of March of this current year of 14,300 occurred. Following this excessive mortality of last month we have 13,700 deaths reported this month, which is within 300 deaths of April, 1891, and within 600 of that of the month preceding, so that it stands the third highest on the record of monthly death rates. It is further exceptional in that it is sequent to a series of months of excessive mortality. In the four months of this year there have been 53,000 deaths in this State, against 44,500 for the same months in 1903, and 43,300 in 1902. At this rate for the year there would be 160,000 deaths against 134,000, or against our average yearly mortality of recent past years of from 125,000 to 130,000.

As to the causes of death affecting this increase, there has been a moderate increase in the number of deaths from the seven common epidemic diseases prevalent in this locality, although in the three years they caused alike between 8 and 9 per cent. of the deaths. Cerebrospinal meningitis, a minor cause of death, is at the present time showing an unusual mortality. Ordinarily having its largest prevalence at this season, or rather in the spring months, while in past years it has had only 150 deaths credited to it in the four months, this year 450 have been due to it. The increase has come in March and April, especially in this current month in which 254 deaths have occurred, the largest of any month on record. It has not been generally distributed, for with the exception of one or two places in the Adirondack district where local outbreaks have from time to time occurred in the past, almost the entire increase of the past two months has come in New York city and chiefly in the borough of Manhattan where more than 200 deaths have occurred instead of ordinarily less than 50, and there is a large increase in April over March. Diphtheria is causing at the present time more deaths than in the past two years at this season and this increase is also mostly in the Maritime district; the same is also true of scarlet fever.

FOR APRIL—(*Concluded*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
...	...	...	...	2	...	2	1	1	2	4	2	4	3	4	2	2	2	4
...	...	...	...	...	...	2	1	...	...	...	...	2	2	...	1	1	1	...
...	...	...	...	...	...	...	1	...	1	...	2	...	1	1	1	1	...	...
...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...
6	...	2	...	7	2	28	29	13	4	21	17	38	29	12	6	21	15	19
...	...	...	...	...	...	1	1	...	...	...	...	1	1	...	...	...	...	1
...	...	...	...	...	...	...	1	1	...	...	1	2	1	...	...	1	1	...
...	...	...	1	...	...	1	...	1	...	...	1	...	2	1	...	1	2	...
...	...	...	...	...	...	...	...	1	...	...	1	...	1	1	...	...	...	1
...	...	...	...	...	...	5	5	2	...	5	2	8	2	2	2	1	2	5
...	...	...	...	...	...	1	...	...	...	...	...	1	4	...	1	...	1	2
...	...	...	...	1	...	...	...	...	...	...	...	1	...	1	...	1	...	...
2	...	...	2	1	2	26	25	21	3	35	23	43	39	12	9	27	13	24
173	225	54	49	330	241	1,399	1,765	1,126	140	663	1,016	1,400	1,290	432	639	493	547	1,353
132	111	57	86	253	182	1,233	.....	†2,056	108	693	854	1,121	1,233	414	500	481	.....	‡1,408

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

The chief increase in mortality is in diseases of the respiratory system, and especially from pneumonia from which there were 2,500 more deaths than in the four months of the two preceding years. The increase has been general throughout the State. Deaths from other acute respiratory diseases are likewise increased, and there is a moderate increase from consumption; 11.5 per cent. of the deaths have been from pneumonia, 8.0 per cent. from other acute respiratory diseases, and 10 per cent from consumption, 16,500 or almost one third of all deaths being from pulmonary diseases. Other local diseases have a larger mortality than in former years. Grippe was mentioned as a contributory cause of death on 983 death certificates out of 16,000 received during the last three months.

SMALLPOX has increased in distribution during the month, or rather new places long infected have come to light. At Cato and other towns in Cayuga county, there is evidence that it has existed as a recognized epidemic, but under a fanciful name, since December, having been imported from Medina where it was then prevalent, and besides spreading throughout the northern part of the county and to adjacent towns in Wayne, has been traced from Cato to Jordan, Onondaga county, and to Corning by a common tobacco industry, also to Auburn and Weedsport. A remarkable instance is reported by the health officer, Dr. Lang, of fatal hemorrhages from mucous surfaces setting in on the fifth day and ending in coma on the ninth. At Ischua, Cattaraugus county, a disregarded outbreak in February has resulted in many cases, not a few continuing at the present time. At East Otto, Little Valley and South Valley, same county, cases have developed. In Cuyler, Preble and Truxton, Cortland county; LaFayette and Jordan, Onondaga county; in Amherst and the adjoining town of Clarence, Erie county, outbreaks exist; and at Hudson, Saratoga Springs and Yonkers, single cases imported from the south have been discovered and controlled without spread, and at Hopewell, Ontario county, one family has likewise been infected. These reports cover the month of May.

A TYPHOID FEVER CIRCULAR has been prepared for distribution to health officers and general use. It states the general conditions on which the spread of the disease and those upon which its suppression and control should be based. With the exception of a few places, those especially taking their public water supply from large sewage-bearing streams, typhoid fever is not prevalent at this time of the year. As is customary, the reported mortality from it decreases in April and continues through May June and some times July, and it then increases to its highest point in October. There is no special prevalence now, but this is a season for correcting conditions that cause the disease, especially at places of summer resorts, whence there is no doubt not a few cases originate. A report card has been also prepared which will be of the greatest value if health officers will all use them for reporting facts regarding every case that occurs in their municipalities. We desire to locate every case, its sanitary surroundings, the history of every locality regarding the prevalence of typhoid fever in former years and especially data regarding the source of every case so clearly as it can be ascertained.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following
during M

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT										
Totals	4,158,600	7,343	20.8	1,161	721	756	380	44	15	1
CITY OF NEW YORK										
Totals	3,838,024	6,835	21.0	1,096	680	650	370	43	14	...
BOROUGH OF MANHATTAN	1,940,121	3,805	22.4	679	282	309	268	16	3	...
BOROUGH OF THE BRONX	294,939	494	19.8	47	61	39	14	2	4	...
BOROUGH OF BROOKLYN	1,334,952	2,199	19.4	326	317	253	80	21	5	...
BOROUGH OF QUEENS	193,494	229	14.0	33	14	28	7	3	2	...
BOROUGH OF RICHMOND	74,158	108	17.2	11	6	21	1	1	...	...
Oyster Bay	16,334	18	....	3	1	7	...	...	...	...
Hempstead	27,066	41	18.0	4	9	10	...	...	...	...
North Hempstead	12,048	24	....	4	0	7	...	...	...	...
Southold	8,301	7	....	0	0	5	...	1	...	...
Sag Harbor	3,500	6	....	0	0	1	...	...	...	...
Huntington	9,483	10	....	1	0	3	...	...	...	...
Brookhaven	14,592	25	....	5	1	5	...	...	...	...
YONKERS	50,000	71	16.8	10	8	15	2	...	...	1
Greenburgh	15,564	17	....	2	0	2	...	...	...	...
MOUNT VERNON	20,346	25	14.5	2	3	3	1	...	...	...
Port Chester	7,440	21	....	3	3	3	3	...	...	...
Ossining	7,939	16	....	1	2	3	1	...	...	...
NEW ROCHELLE	14,720	25	....	4	1	3	3	...	...	...
Peekskill	10,358	18	....	3	5	1	...	...	...	...
White Plains	7,900	11	....	4	1	0	...	...	...	...
Rest of District	95,000	173	21.5	19	7	38	...	...	1	...
HUDSON VALLEY DISTRICT										
Totals	696,000	948	16.1	108	44	236	11	20	1	...
ALBANY	100,000	145	17.0	12	6	22	3	2	...	...
COHOES	24,000	35	17.1	8	1	6	...	3	...	...
TROY	75,057	118	18.5	15	4	28	1	4	...	...
WATERVLIET	14,321	23	....	0	5	5	1	...	...	...
Green Island	4,770	3	....	0	1	0	...	1	...	...
Hoosick Falls	5,671	6	....	1	0	0	...	...	...	...
RENSSELAER	7,466	7	....	0	0	2	...	...	...	...
Coxsackie	4,102	6	....	1	0	1	...	...	...	...
Catskill	5,486	9	....	0	0	5	...	...	...	...
HUDSON	9,528	11	....	1	0	2	...	...	...	...
KINGSTON	24,535	20	10.0	4	0	9	...	...	...	...
Ellenville	3,000	6	....	1	1	2	...	...	...	...
Marbletown	3,511	3	....	1	0	0	...	...	...	...
Rosendale	6,278	12	....	2	0	0	...	...	...	...
Esopus	4,907	8	....	1	0	4	...	1	1	...
Saugerties	3,700	6	....	0	0	2	...	...	...	...
POUGHKEEPSIE	24,029	41	20.0	7	0	15	...	...	...	...
Fishkill	13,016	11	....	2	1	1	...	...	...	...
Wappingers Falls	3,504	4	....	1	0	1	...	...	...	...
NEWBURG	25,000	40	18.8	6	5	1	3	2	...	...
Port Jervis	9,385	23	....	2	3	3	1	...	...	...
MIDDLETOWN	14,522	25	....	4	1	4	1	...	...	...
Warwick	6,403	4	....	0	1	1	...	...	...	...
Goshen	4,564	3	....	1	0	2	1	...	...	...

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York ay, **1904.**

in Roman type. Population estimated to date printed in full face figures.]

DISEASES						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
112	162	27	25	225	194	842	748	616	67	271	648	603	793	264	419	109	283	495
109	154	27	20	215	189	783	700	599	62	239	610	538	730	241	388	90	262	452
45	63	17	9	126	127	394	375	413	36	128	313	292	494	137	231	40	126	152
21	22	...	...	17	7	138	37	14	5	14	48	29	29	16	25	7	11	34
38	69	10	10	63	47	221	245	150	18	85	215	189	170	77	99	38	117	232
4	...	...	1	5	8	24	34	14	1	8	25	19	24	5	17	3	4	21
1	...	...	...	4	...	6	9	8	2	4	9	9	13	6	16	2	4	13
...	1	...	...	1	...	2	3	...	...	...	1	5	1	...	...	1	...	3
...	3	...	2	3	...	3	4	2	...	2	1	5	2	2	1	4	3	4
...	...	...	...	...	1	...	3	1	...	2	3	4	2	1	2	2	...	3
...	...	...	...	...	...	1	...	...	...	1	...	1	1	...	...	2	...	...
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...	...	...	...	2	1	8	13	2	1	2	7	4	12	4	2	1	4	5
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2	3	...	...	1	1	21	15	5	2	11	14	25	31	8	13	4	4	12
7	15	...	6	7	7	99	78	50	7	71	72	128	107	47	53	57	36	69
1	...	...	...	...	...	18	21	5	1	17	17	16	5	6	13	4	10	6
2	...	...	...	...	2	1	...	5	...	3	1	2	6	3	...	2	...	5
...	...	...	1	1	1	17	11	4	...	3	11	19	10	6	7	9	3	10
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...	...	...	...	...	1	1	1	...	...	2	1	1	1	2	...	...	...	1
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...	5	...	...	...	...	5	3	1	...	4	5	2	2	1	1	...	1	5
...	2	...	...	...	...	1	3	2	...	4	1	2	3	...	1	1	...	2
...	2	...	...	1	...	1	1	2	1	2	2	5	4	...	...	...	1	2
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SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC			
							Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT.—(Con.)										
Montgomery	5,939	10	....	1	2	4	...	...	...	...
Haverstraw	9,874	2	....	......	......	1	...	...	...	...
Nyack	4,275	9	....	2	0	1	...	...	...	...
Ramapo	7,502	18	....	3	1	5	...	...	...	...
Rest of District	271,800	340	15.0	32	12	109	...	7	...	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	490	14.7	65	17	157	3	11	...	...
WATERTOWN	21,700	36	19.5	8	0	8	...	3	...	...
Ellisburgh	3,888	4	....	0	1	1	...	...	...	...
Cape Vincent	2,882	......	....	......	......	......	...	...	...	...
Clayton	4,313	2	....	0	0	1	...	1	...	...
OGDENSBURG	12,633	25	....	1	0	8	...	4	...	...
Gouverneur	6,000	4	....	1	0	1	...	...	...	...
Potsdam	3,843	5	....	1	0	2	...	...	...	...
Canton	6,387	8	....	1	0	2	...	...	...	...
Malone	5,935	15	....	3	1	4	2	...	...	...
PLATTSBURG	8,434	9	....	1	0	4	...	...	...	...
Glens Falls	12,613	20	....	2	1	4	...	...	...	...
Whitehall	4,377	6	....	0	1	2	...	...	...	...
Fort Edward	5,216	5	....	1	0	2	...	...	...	...
Sandy Hill	4,473	5	....	0	0	1	...	1	...	...
Granville	5,217	5	....	0	0	1	...	1	...	...
Greenwich	4,172	8	....	0	1	4	...	...	...	...
Lowville	3,746	7	....	1	0	5	...	...	...	...
Rest of District	279,000	326	13.7	45	12	107	1	1	...	...
MOHAWK VALLEY DISTRICT Totals	430,000	637	17.8	73	44	163	4	5	...	...
SCHENECTADY	47,625	77	18.1	15	10	4	1	1	...	...
Cobleskill	3,973	6	....	0	0	3	...	1	...	...
AMSTERDAM	20,929	30	17.0	5	3	6	...	...	...	...
Fort Plain	2,444	7	....	0	0	4	...	...	...	...
JOHNSTOWN	10,130	16	....	2	1	5	...	...	...	...
GLOVERSVILLE	18,349	31	....	4	2	4	1	...	...	...
LITTLE FALLS	10,381	15	....	1	0	4	...	...	...	...
Herkimer	5,555	5	....	0	0	0	...	...	...	...
Ilion	5,138	3	....	0	0	1	...	...	...	...
UTICA	56,383	120	24.0	11	12	29	...	1	...	...
Whitestown	6,235	7	....	2	1	2	...	...	...	...
ROME	15,343	27	....	3	0	4	...	...	...	...
Boonville	3,332	2	....	0	0	2	...	...	...	...
Camden	3,745	5	....	2	0	3	...	...	...	...
Waterford	6,157	8	....	1	1	0	...	...	...	...
Mechanicville	4,695	10	....	3	2	1	...	...	...	...
Ballston Spa	3,923	8	....	0	0	2	...	...	...	...
Saratoga Springs	12,409	21	....	4	0	4	...	...	...	...
Rest of District	183,250	238	15.0	20	12	85	2	2	...	...
SOUTHERN TIER DISTRICT Totals	433,000	621	17.0	67	23	180	3	7	1	...
BINGHAMTON	40,000	65	18.8	5	3	7	...	...	...	...
Owego	5,039	7	....	0	0	1	...	...	...	...
Candor	3,330	5	....	0	0	3	...	...	...	...
Waverly	4,500	9	....	1	0	3	...	...	...	...
ELMIRA	35,672	50	16.5	9	1	7	2	2	...	...

FOR MAY—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer..	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
			2			1	1						1			2	1	2
												1		1				
						1					1				2	1	2	2
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4	4		2	2	2	40	21	18	3	23	15	57	48	21	18	22	12	21
1		3	9	4	5	49	32	17	7	40	39	55	60	25	19	40	29	42
		1	1			1		4		5	4	3	4	2			4	4
					1	1				1			1					
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				1			2	1		1	3	1	3	3		2	2	2
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5	2	1	2	10	7	66	67	26	4	48	50	73	87	21	45	44	23	47
			2	3	3	11	7	5	1	6	2	1	8	1	10	2	2	11
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				1		2	1	2	1	3	3	8	2			2	3	2
1						1					4	3	1		1	2	1	1
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4	1			1	1	11	14	3	1	9	9	16	19	8	4	5	4	9
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						6	1			5	3		3		3	2	2	2
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						3	1	1		2	3	2	4	1	2		1	1
		1		5		25	27	9	1	16	18	33	33	5	15	23	6	17
4	8	4	4	2	4	40	50	29	11	44	47	98	91	23	47	38	19	47
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										2		1	1			1		
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2						5	4	5		6	4	8	4	1	2	1		4

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DIST.—(*Con.*)										
Horseheads	5,000	6	....	1	0	3	...	...	...	...
HORNELLSVILLE	12,000	14	....	5	1	4	...	...	...	...
Bath	5,000	1	....	0	0	0	...	...	...	...
CORNING	11,061	15	....	1	0	4	1	1	...	...
Wellsville	5,000	12	....	3	1	0	...	...	...	...
OLEAN	9,462	15	....	1	0	1	...	...	...	...
Salamanca	4,251	7	....	0	0	0	...	...	...	...
DUNKIRK	15,000	17	....	5	2	3	...	1	...	...
JAMESTOWN	22,892	32	16.3	4	1	5	...	1	1	...
Westfield	2,430	9	....	0	0	4	...	...	...	...
Fredonia	4,125	12	....	0	1	8	...	...	...	...
Rest of District	248,600	345	16.3	32	13	127	...	2	...	...
EAST CENTRAL DISTRICT Totals	404,500	561	16.4	54	18	201	2	3	1	...
SYRACUSE	110,000	165	17.7	27	11	42	1	1	...	...
Baldwinsville	3,000	1	....	0	0	1	...	...	...	...
Dewitt	5,435	6	....	0	0	1	...	1	...	...
CORTLAND	9,014	12	....	2	0	5	...	...	...	...
Homer	2,381	3	....	2	0	0	...	...	...	...
ONEIDA	7,942	6	....	0	0	3	...	...	...	...
Hamilton	3,744	3	....	0	0	1	...	...	...	...
Cazenovia	3,830	7	....	1	0	2	...	...	...	...
Canastota	3,300	1	....	0	0	1	...	...	...	...
Norwich	5,766	5	....	0	1	2	1	...	...	...
Oneonta	7,147	11	....	1	0	6	...	...	...	...
Worcester	2,409	5	....	0	0	2	...	...	...	...
Cooperstown	2,368	4	....	......	......	2	...	...	...	...
Walton	4,869	4	....	0	0	3	...	...	...	...
Delhi	3,243	2	....	1	0	0	...	...	...	...
Liberty	4,568	17	....	1	0	1	...	...	1	...
Rest of District	225,540	309	16.0	19	6	129	...	1	...	...
WEST CENTRAL DISTRICT Totals	320,600	457	16.8	50	13	160	1	2	1	...
AUBURN	35,000	49	16.5	7	6	8	...	...	...	...
ITHACA	13,136	14	....	0	0	5	...	...	...	...
Hector	4,137	7	....	0	0	2	...	...	...	...
Waterloo	4,256	6	....	0	0	1	...	...	...	...
Seneca Falls	6,519	11	....	0	2	1	...	...	...	...
GENEVA	10,433	11	....	1	0	4	...	...	...	...
Canandaigua	6,151	12	....	1	0	2	...	...	...	...
Manchester	4,733	5	....	0	0	4	...	...	...	...
Phelps	4,788	5	....	1	0	3	...	...	...	...
Penn Yan	4,650	12	....	1	0	5	...	...	...	...
Batavia	9,180	13	....	1	0	3	...	1	...	...
Dansville	3,633	6	....	2	0	1	...	...	...	...
Le Roy	3,144	6	....	0	0	3	...	...	...	...
Warsaw	4,341	3	....	1	0	2	...	...	...	...
Rest of District	206,500	297	17.0	35	5	116	1	1	1	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	915,000	1,186	15.2	177	72	275	5	16	...	1
BUFFALO	380,000	504	15.6	99	41	69	2	4	...	...
TONAWANDA	7,421	5	....	1	1	2	...	...	...	...
Amherst	4,223	4	....	1	0	0	...	...	...	...
NORTH TONAWANDA	9,069	17	....	8	1	0	1	1	...	...
LOCKPORT	16,581	27	....	9	1	3	...	1	...	...

FOR MAY—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
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...	...	1	...	1	1	6	1	2	...	2	...	6	5	2	2	...	...	1
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1	6	3	1	1	2	18	28	10	5	17	27	55	61	14	27	26	15	26
7	3	5	...	5	4	56	50	17	4	38	40	80	71	24	33	50	32	36
7	...	4	...	3	2	14	12	6	2	11	13	17	25	6	7	9	9	16
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...	...	...	...	1	...	1	2	...	...	1	1	3	...	1	1	...	...	1
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...	...	...	...	...	...	...	...	...	...	1	1	1	1	...	1	...	1	...
...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	1
...	...	...	...	...	...	...	1	...	...	...	1	2	1	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
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...	...	...	...	...	...	...	1	...	...	1	2	3	2	...	...	1	1	...
...	...	...	...	...	...	...	...	...	...	...	1	1	...	1	1	1	...	...
...	...	...	...	...	...	1	...	...	...	...	...	2	1	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	1	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
...	...	...	...	...	...	11	...	1	...	...	2	...	1	...	...	1	...	...
...	3	1	...	1	2	29	33	9	2	24	18	45	37	15	20	36	20	13
...	2	3	...	5	8	35	43	12	5	38	31	72	73	20	17	32	30	27
...	...	...	...	3	4	5	4	4	...	3	3	4	4	3	1	1	6	4
...	...	...	...	...	...	1	1	...	...	1	2	1	2	2	1	...	3	...
...	...	...	...	...	...	2	...	...	...	...	...	1	2	1	...	1	...	...
...	...	...	...	...	...	1	...	...	...	1	1	2	1	...	...	...	...	...
...	...	...	...	...	1	1	2	...	...	1	...	4	1	...	...	...	1	...
...	...	...	...	...	...	...	4	1	...	1	1	...	2	...	...	1	...	1
...	...	...	...	...	...	3	1	...	...	...	...	2	2	1	1	...	1	1
...	...	...	...	...	...	...	...	...	...	1	1	1	1	...	...	1	...	...
...	...	...	...	...	...	...	...	...	...	1	...	1	2	...	...	...	...	1
...	1	...	...	...	...	...	3	...	...	...	...	3	3	...	...	1	1	...
...	...	...	...	...	...	2	...	...	...	3	...	3	...	1	1	...	2	...
...	1	...	...	...	...	...	1	...	...	...	2	1	...	...	...	...	...	1
...	...	...	...	...	...	...	...	...	...	1	...	1	3	...	...	...	1	...
...	...	...	...	...	1	...	...	...	...	...	...	...	2	...	...	...	...	...
...	...	3	...	2	2	20	27	7	5	25	21	48	48	12	13	27	15	19
9	1	9	5	28	18	110	104	72	11	93	58	155	138	63	75	55	66	94
3	...	3	1	8	12	56	45	49	6	43	26	56	44	23	36	13	29	45
...	...	...	...	...	...	...	...	1	...	1	...	1	...	...	...	1	...	1
...	...	...	...	...	...	...	...	1	...	...	...	...	1	...	1	...	...	1
...	...	...	...	...	...	3	4	...	...	1	1	...	2	1	...	...	...	3
...	...	...	...	1	1	2	8	8	...	1	1	3	3	1	...	...	1	6

MONTHLY BULLETIN

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Con.*)										
NIAGARA FALLS	25,000	37	19.2	8	2	4	1	2	...	...
Medina	4,716	3	....	0	0	1	...	...	...	...
Albion	4,477	8	....	1	0	1	...	...	...	...
Brockport	3,400	5	....	0	0	2	...	...	...	...
ROCHESTER	165,000	220	15.7	25	8	51	...	...	...	...
Palmyra	3,758	4	....	1	0	1	...	...	...	...
Newark	4,578	5	....	0	0	1	...	...	...	...
Lyons	5,824	4	....	1	0	2	...	...	...	...
Clyde	2,507	10	....	0	0	7	...	1	...	...
OSWEGO	22,200	46	24.4	5	4	8	1	3	...	...
FULTON	8,734	15	....	0	2	8	...	...	...	...
Richland	3,535	4	....	0	0	2	...	...	...	...
Rest of District	244,184	268	13.0	18	12	118	...	4	...	1
Totals for the State	7,738,000	12,243	18.6	1,754	952	2,128	409	108	19	2
Average for past five years	....	10,445	16.5	......	*2,689	1,066	54	98	20	26

* All deaths under 5 years of age.

REMARKS—For the first time this year the month's temperature has been above the normal, there having been a daily average excess of 3 degrees as compared with the mean of thirty years. The preceding months have had a subnormal temperature from 1 to 7 degrees, and the average accumulated deficiency since January 1st amounts to 440 degrees, which is less by nearly 100 degrees than at the end of April. The mean temperature of the month was raised by a warm spell from the 22d to the 26th when highest temperatures of 85 degrees were reached. The rainfall was generally deficient with the exception of the west central part of the State, where alone there were two days of more than 1 inch of precipitation. This part of the State also had one half the days cloudy, nearly half of the days in the rest of the State being sunshiny. The wind was prevailingly from the south, and the total movement was moderate with maximum velocity of 35 miles per hour.

DYSENTERY AND SUMMER DIARRHEA—AN ANNOUNCEMENT—The Antitoxin Laboratory is now in a position to supply health officers with a limited amount of antidysenteric serum for the use of the physicians who have cases of dysentery in adults or in children, or cases of summer diarrhea in children, and desire to test the efficiency of this treatment.

According to the present weight of evidence cases of diarrhea characterized by the presence of considerable amounts of blood and mucous in the stools, and generally with severe prostration, are caused by infection with Bac. Dysenteriae (Shiga). The faeces in these cases usually show the presence of this bacillus in large numbers to the almost complete exclusion of other bacteria.

In other forms of diarrhea, especially when the stools contain considerable quantities of mucous, and possibly a small amount of blood, Bac. Dysenteriae has been frequently found in the faeces, but usually after more or less prolonged search. It is open to question whether this microorganism is of any etiological significance in all of such cases.

If the antidysenteric serum is likely to be shown to be of therapeutic value it will certainly be demonstrated in its use on the first class of cases.

According to the present conceptions it should also act more efficiently as a preventive agent than for the treatment of these forms of disease. It should, therefore, be used as early as possible in the course of disease, or at once in suspected cases.

It should be injected subcutaneously in the same manner, and with the same precautions, as in the injection of diphtheria antitoxin.

Health officers should notify the Department if they desire a supply of this serum for use during the summer.

FOURTH OF JULY TETANUS, ITS PREVENTION AND SPECIFIC TREATMENT—Health officers are again urged to spread broadcast in their district the information that tetanus frequently follows blank cartridge and other wounds, especially where it is difficult to thoroughly treat the injury. Also that by the injection of an immunising dose of tetanus antitoxin the onset of the disease can certainly be prevented.

FOR MAY—(*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	2	3	2	6	4	2	...	1	.....	1	4	...	2	...	2	5
....	...	...	...	...	.....	.....	......	....	...	.....	.....	1	1	1	...	...	.....	......
....	...	...	...	...	1	1	......	....	...	1	.....	1	.....	1	...	1	2	......
....	...	...	...	...	.....	.....	......	....	...	.....	1	.....	2	...	1	1	.....	......
6	...	2	...	12	1	19	13	10	2	19	13	28	27	12	13	12	16	15
....	...	...	...	...	.....	.....	......	....	...	1	.....	.....	1	...	2	...	.....	......
....	...	...	...	...	.....	1	......	....	...	.....	.....	.....	.....	2	...	1	.....	1
....	...	...	...	...	.....	1	......	....	...	.....	.....	1	1	...	...	...	.....	1
....	...	...	...	...	.....	.....	......	....	...	2	3	.....	2	...	1	...	1	......
....	...	...	...	1	1	3	2	1	...	6	2	9	9	2	3	1	.....	2
....	...	1	...	...	.....	.....	1	1	...	2	1	4	2	1	1	1	.....	......
....	...	...	...	...	.....	.....	......	....	...	.....	1	1	1	...	...	1	.....	......
....	1	8	2	3	.....	18	32	4	3	15	9	49	38	19	15	23	15	14
145	193	52	51	286	247	1,297	1,172	839	116	643	985	1,264	1,420	487	708	425	518	857
135	111	44	77	255	204	1,298	.....	†1,515	95	665	818	1,084	1,159	423	609	428	.....	‡1,331

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

Whenever it is not possible or the physician is not permitted to thoroughly open the injured area and remove any foreign bodies present in it, he should certainly inject an immunizing dose of tetanus antitoxin. The physician who neglects to give the patient this simple method of protection is not fulfilling his whole duty, to say the least.

Health officers who do not provide for the needs of the physician in this respect are also negligent, for the State Department of Health has repeatedly offered to permit them to keep a stock of immunizing doses of tetanus antitoxin on hand for use when needed. Health officers should not rely on the fact that tetanus is not a common disease in their districts, for during the last two years every county in the State has had at least one case, and in most instances several fatal cases of the disease. There were last year eighteen deaths resulting from tetanus, due to Fourth of July injuries, in New York State, outside of the cities of New York, Yonkers and Buffalo.

If a case of tetanus should occur within the jurisdiction of a health officer he should urge the immediate use of such tetanus antitoxin as he may have on hand, and at once telegraph to the State Department of Health, at Albany, stating the existence of the case. The Department will at once forward to him a large supply of fifty cubic centimetre doses of a highly potent tetanus antitoxin, and a needle and coupling designed to be used with an antitoxin syringe for the intraspinal injection of the remedy by means of lumbar puncture.

The Department recommends the subcutaneous or intravenous injection of fifty cubic centimetres every six or eight hours, and the intraspinal injection of the same amount every twelve to twenty-four hours during the very acute stage of the disease. When the acute stage has passed only the subcutaneous doses need be given. Circulars, giving directions for its use, accompany each fifty cubic centimetre bottle, and are included in the package containing the special needle and coupling.

Health officers of districts remote or difficult of access from Albany, and those of cities and large villages, will be permitted to keep on hand two or more fifty cubic centimetre doses of the antitoxin, and also the special needle and coupling.

[This timely warning by the Director of the Antitoxin Laboratory, Dr. H. D. Pease, should be noted by all health officers, at a period of the year when tetanus is most likely to occur. The success of the remedy depends largely on its early use, and its use to immunize, a fact to the consideration of which it is entitled.]

THE MAY MORTALITY—The deaths occurring this month are less by 1,400 than in April, a saving of 60 deaths a day, but continue excessive, being 1,800 above the May average. The respective decrease and increase, both, are in diseases of the respiratory, circulatory and urinary systems. The reported mortality from nervous diseases is very high this month, mostly in New York city, where also occurred 370 deaths from cerebrospinal meningitis. Other zymotic mortality is not abnormal. Smallpox caused 2 deaths, 1 in Yonkers and 1 in Cuba; no spread to new places since last month is to be noted.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following
during Ju

[Cities are printed in SMALL CAPITALS villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT Totals	4,158,600	6,889	20.0	1,311	937	609	221	36	14	2
CITY OF NEW YORK Totals	3,838,024	6,473	20.5	1,231	905	526	218	32	13	2
BOROUGH OF MANHATTAN	1,940,121	2,956	18.0	636	489	281	150	14	3	...
BOROUGH OF THE BRONX	294,939	1,322	....	83	125	41	15	3	4	1
BOROUGH OF BROOKLYN	1,334,952	1,882	17.0	451	253	166	45	13	6	1
BOROUGH OF QUEENS	193,494	214	13.5	46	25	21	4	1	...	...
BOROUGH OF RICHMOND	74,158	99	16.0	15	13	17	4	1	...	...
Oyster Bay	16,334	9	....	1	0	5	...	...	...	...
Hempstead	27,066	29	....	7	2	7	...	1	...	...
North Hempstead	12,048	14	....	4	2	1	...	...	...	...
Southold	8,301	4	....	0	0	4	...	...	...	...
Sag Harbor	3,500	2	....	1	0	1	...	...	...	...
Huntington	9,483	11	....	3	1	4	...	...	...	...
Brookhaven	14,592	19	....	6	0	7	...	...	...	...
YONKERS	50,000	76	17.4	18	9	6	...	...	...	...
Greenburg	15,564	16	....	3	1	0	...	...	...	...
MOUNT VERNON	20,346	25	....	6	4	3	...	1	...	...
Port Chester	7,440	13	....	4	0	0	1	...	...	...
Ossining	7,939	10	....	2	0	2	...	...	...	...
NEW ROCHELLE	14,720	16	....	1	0	5	1	1	...	...
Peekskill	10,358	17	....	5	3	2	...	...	...	...
White Plains	7,900	9	....	2	1	2	1	...	...	...
Rest of District	95,000	146	18.4	17	9	34	...	1	1	...
HUDSON VALLEY DISTRICT Totals	696,000	883	15.4	119	46	170	4	13	...	...
ALBANY	100,000	118	14.4	8	2	18	...	2	...	...
COHOES	24,000	28	14.6	6	0	4	...	...	...	...
TROY	75,057	114	18.5	17	8	17	...	1	...	...
WATERVLIET	14,321	13	....	3	0	1	...	...	...	...
Green Island	4,770	6	....	1	1	1	1	...	...	...
Hoosick Falls	5,671	9	....	1	0	3	...	...	...	...
RENSSELAER	7,466	12	....	1	1	2	...	...	...	...
Coxsackie	4,102	1	....	0	0	1	...	...	...	...
Catskill	5,486	6	....	3	1	1	...	1	...	...
HUDSON	9,528	14	....	3	2	4	...	...	...	...
KINGSTON	24,535	24	12.0	2	3	3	...	...	...	...
Ellenville	3,000	3	....	0	0	1	...	...	...	...
Marbletown	3,511	4	....	1	1	2	...	...	...	...
Rosendale	6,278	6	....	0	0	1	...	...	...	...
Esopus	4,907	9	....	2	0	2	...	...	...	...
Saugerties	3,700	2	....	1	0	0	...	...	...	...
POUGHKEEPSIE	24,029	44	22.8	10	1	7	...	...	...	...
Fishkill	13,016	14	....	3	1	2	...	1	...	...
Wappingers Falls	3,504	4	....	0	0	1	...	...	...	...
NEWBURG	25,000	28	13.7	5	2	4	1	...	...	...
Port Jervis	9,385	11	....	1	1	1	...	2	...	...
MIDDLETOWN	14,522	14	....	1	0	2	...	...	...	...
Warwick	6,403	5	....	0	1	0	...	...	...	...

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York ne, **1904.**

Roman type. Population estimated to date printed in full face figures.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years.)	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
DISEASES.						OTHER CAUSES OF DEATH.												
67	104	18	18	190	487	681	325	388	57	232	496	438	547	211	1401	70	284	602
64	98	16	18	188	474	643	304	366	56	206	458	393	494	190	1362	58	260	560
25	43	12	9	104	217	281	163	248	26	95	209	221	313	100	273	25	129	296
9	10	1	...	6	15	114	20	12	4	11	41	16	25	13	941	8	24	29
26	44	3	9	69	219	214	105	94	23	87	177	130	120	64	113	21	98	201
2	1	...	...	8	19	27	15	6	1	11	25	15	18	7	20	3	3	28
2	...	...	...	1	4	7	1	6	2	2	6	11	18	6	15	1	6	6
...	1	...	...	...	...	1	...	...	...	1	1	2	1	...	...	1	...	1
...	2	...	...	...	1	...	1	1	1	2	4	6	2	...	1	...	2	5
...	...	...	...	...	...	1	...	2	...	1	...	2	2	...	2	1	...	3
...	...	...	...	...	...	1	...	...	...	...	2	1	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
...	...	...	...	...	1	...	...	...	...	...	1	2	2	...	2	1	...	2
...	...	...	...	...	...	2	2	1	...	2	...	1	4	2	...	1	1	3
...	...	1	...	1	2	5	5	9	...	5	8	5	6	2	11	1	8	7
1	...	...	...	1	...	2	1	...	...	1	2	1	...	2	2	...	1	2
1	...	...	...	...	1	3	3	1	...	...	3	...	1	2	2	...	3	4
...	...	...	...	...	3	...	1	...	...	...	1	2	1	1	2	...	...	1
...	...	...	...	...	...	1	1	...	...	...	...	1	...	1	3	1	...	2
...	...	...	...	...	...	1	...	...	...	...	1	4	1	1	4	1	1	...
...	1	...	...	...	2	1	1	2	...	...	1	...	4	...	...	...	2	3
...	...	...	...	...	1	...	1	...	...	2	1	1	...	...	2	...	...	...
1	2	1	...	...	2	20	5	6	...	12	13	17	29	10	8	4	6	8
...	9	2	6	12	15	120	27	27	5	78	74	114	118	38	64	34	38	85
...	...	...	...	...	1	19	6	4	...	9	19	11	12	11	9	...	8	7
...	...	...	...	...	...	5	...	...	...	6	2	1	4	...	4	1	...	5
...	...	...	...	1	2	20	5	6	...	10	11	15	8	3	12	3	5	12
...	...	...	...	2	...	2	...	1	...	...	1	1	2	...	1	...	...	3
...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	1	...	2
...	...	...	...	...	...	...	...	...	...	1	...	1	3	1	...	1	1	1
...	...	...	...	...	...	...	3	...	...	2	...	1	1	1	1	2	...	1
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	...	3
...	...	...	...	...	...	2	...	1	...	...	...	2	3	...	...	1	1	4
...	...	1	1	1	...	3	...	1	1	2	2	4	4	1	1	...	1	1
...	...	...	...	...	...	...	1	...	...	1	...	...	1	...	...	...	...	...
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...	...	...	...	...	1	1	...	...	...	2	2	...	...	1	...	...	1	...
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...	1	...	...	...	...	5	1	5	...	6	1	6	9	1	1	2	1	4
...	...	...	...	...	2	4	1	1	...	...	...	...	3	...	...	1	...	...
...	...	...	...	...	...	1	...	...	...	...	1	...	1	...	...	...	...	...
...	...	...	1	2	1	4	1	1	...	2	4	2	4	...	1	...	1	3
...	...	...	...	1	...	...	...	...	...	3	...	1	1	...	...	...	...	3
...	1	...	...	...	...	2	...	...	...	4	1	3	1	2	...	...	...	...
...	...	...	...	...	...	1	...	...	...	1	...	1	1	...	...	...	...	1

MONTHLY BULLETIN

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT—(*Con.*)										
Goshen	4,564	4	....	1	0	0	...	...	...	...
Montgomery	5,939	5	....	1	0	0	...	1	...	...
Haverstraw	9,874	6	....	0	1	2	...	...	...	...
Nyack	4,275	5	....	1	1	0	...	...	...	...
Ramapo	7,502	13	....	2	1	0	...	...	...	...
Rest of District	271,800	361	16.5	45	18	90	2	5	...	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	439	13.0	60	13	126	1	4	...	...
WATERTOWN	21,700	23	13.0	6	0	4	...	1	...	...
Ellisburg	3,888	8	....	1	0	4	...	...	...	...
Cape Vincent	2,882	3	....	0	0	1	...	...	...	...
Clayton	4,313	2	....	0	1	0	...	...	...	...
OGDENSBURG	12,633	29	....	7	3	6	...	1	...	...
Gouverneur	6,000	9	....	0	0	3	...	...	...	...
Potsdam	3,843	3	....	0	0	0	...	...	...	...
Canton	6,387	9	....	0	1	7	...	...	...	...
Malone	5,935	1	....	0	0	0	...	...	...	...
PLATTSBURG	8,434	11	....	0	1	0	...	...	...	...
Glens Falls	12,613	9	....	0	1	1	1	...	...	...
Whitehall	4,377	4	....	1	0	1	...	...	...	...
Fort Edward	5,216	2	....	0	0	0	...	...	...	...
Sandy Hill	4,473	6	....	1	0	1	...	...	...	...
Granville	5,217	13	....	2	0	6	...	...	...	...
Greenwich	4,172	3	....	0	0	3	...	...	...	...
Lowville	3,746	4	....	0	0	1	...	...	...	...
Rest of District	279,000	300	13.0	42	6	88	...	2	...	...
MOHAWK VALLEY DISTRICT Totals	428,400	465	13.0	63	25	113	3	1	...	...
SCHENECTADY	56,000	49	10.6	9	5	7	1	...	...	...
Cobleskill	3,973	3	....	1	0	0	...	...	...	...
AMSTERDAM	20,929	21	....	3	3	4	...	...	...	...
Fort Plain	4,444	2	....	0	0	1	...	...	...	...
JOHNSTOWN	10,130	4	....	2	0	0	...	...	...	...
GLOVERSVILLE	18,349	17	....	6	1	2	1	...	...	...
LITTLE FALLS	10,381	9	....	0	0	4	...	1	...	...
Herkimer	5,555	3	....	1	0	2	...	...	...	...
Ilion	5,138	2	....	1	0	1	...	...	...	...
UTICA	56,383	90	19.0	17	6	14	...	...	...	...
Whitestown	6,235	7	....	1	0	3	...	...	...	...
ROME	15,343	20	....	2	0	1	1	...	...	...
Boonville	3,332	6	....	0	0	1	...	...	...	...
Camden	3,745	.....	....	.....	.....	.....	...	...	...	...
Waterford	6,157	6	....	1	1	1	...	...	...	...
Mechanicville	4,695	8	....	2	1	0	...	...	...	...
Ballston Spa	3,923	7	....	0	0	1	...	...	...	...
Saratoga Springs	12,409	14	....	1	2	4	...	...	...	...
Rest of District	183,250	197	12.5	16	6	67	...	...	...	...
SOUTHERN TIER DISTRICT Totals	433,000	506	13.8	36	14	159	5	7	...	...
BINGHAMTON	40,000	53	16.0	1	2	14	...	1	...	...
Owego	5,039	13	....	1	1	5	...	...	...	...
andor	3,330	3	....	0	0	2	...	...	...	...
Waverly	4,500	3	....	0	0	2	...	...	...	...
ELMIRA	35,672	34	12.0	3	0	5	...	...	...	...

FOR JUNE—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
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...	...	...	...	...	...	3	1	1	...	1	1	2	3	...	1	...	...	...
...	7	1	4	3	6	41	7	6	3	26	27	58	50	16	31	18	18	32
4	...	...	3	3	3	52	17	10	7	29	30	64	54	13	30	33	27	55
...	...	...	1	...	...	2	1	...	...	...	1	2	2	3	2	2	2	4
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...	...	...	...	...	1	2	...	1	...	1	2	...	1	...	1	2	1	1
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2	...	...	1	...	1	36	18	4	4	18	20	48	34	8	22	25	19	43
8	4	...	2	10	7	53	23	13	9	46	36	48	47	23	37	34	20	41
...	...	...	1	2	3	4	1	2	...	6	2	3	5	4	8	2	1	4
...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	1
...	2	...	...	...	...	3	1	1	...	4	1	2	...	...	2	1	2	2
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1	...	...	...	1	...	1	...	2	1	...	3	2	3	...	...	...	...	2
...	...	...	...	...	...	...	1	...	...	1	1	2	2	...	1	...	...	...
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6	1	...	...	1	3	11	6	3	1	9	4	8	10	6	7	4	3	7
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1	1	...	...	...	...	5	...	1	1	1	3	...	...	1	...	1	2	2
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...	...	...	1	5	...	18	11	2	4	17	18	29	20	12	13	20	8	19
4	1	1	...	8	3	51	18	10	1	44	39	77	64	38	34	42	22	37
1	...	...	...	...	1	10	1	1	...	2	3	10	8	2	3	4	4	2
...	...	...	...	...	...	2	1	1	...	3	1	...	1	1	1	1	...	1
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SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DIST.—(*Con.*)										
Horseheads	5,000	2	....	0	0	2	...	...	...	...
HORNELLSVILLE	12,000	14	14.0	1	1	3	...	...	...	...
Bath	5,000	6	....	0	0	0	...	...	...	...
CORNING	11,061	11	12.0	3	0	1	...	...	...	...
Wellsville	5,000	3	....	0	0	0	...	...	...	...
OLEAN	9,462	8	....	1	0	1	1	...	...	...
Salamanca	4,251	5	....	0	0	3	...	...	...	...
DUNKIRK	15,000	21	16.5	3	2	5	...	1	...	...
JAMESTOWN	22,892	21	12.0	1	1	8	1	...	...	...
Westfield	2,430	5	....	0	0	2	...	...	...	...
Fredonia	4,125	3	....	2	0	0	...	...	...	...
Rest of District	248,600	301	14.3	20	7	106	3	5	...	...
EAST CENTRAL DISTRICT Totals	404,500	491	14.6	46	23	138	1	5	...	...
SYRACUSE	110,000	133	14.7	14	9	23	...	1	...	...
Baldwinsville	3,000	2	....	0	0	1	...	...	...	...
DeWitt	5,435	7	....	2	0	1	...	...	...	...
CORTLAND	9,014	6	....	1	0	2	...	...	...	...
Homer	2,381	2	....	0	0	2	...	...	...	...
ONEIDA	7,942	8	....	0	0	3	...	1	...	...
Hamilton	3,744	8	....	1	0	6	...	...	...	...
Cazenovia	3,830	3	....	0	0	1	...	...	...	...
Canastota	3,300	6	....	0	0	0	...	...	...	...
Norwich	5,766	8	....	0	1	3	...	...	...	...
Oneonta	7,147	16	....	1	2	1	...	...	...	...
Worcester	2,409	1	....	1	0	0	...	...	...	...
Cooperstown	2,368	3	....	0	0	1	...	...	...	...
Walton	4,869	7	....	1	0	2	...	...	...	...
Delhi	3,243	2	....	0	0	0	...	...	...	...
Liberty	4,568	13	....	0	0	3	...	...	...	...
Rest of District	225,540	266	14.5	25	11	89	1	3	...	...
WEST CENTRAL DISTRICT Totals	320,600	357	13.2	34	9	128	...	2	...	...
AUBURN	35,000	38	13.2	5	2	10	...	...	...	...
ITHACA	13,136	16	....	2	1	3	...	...	...	...
Hector	4,137	2	....	0	0	2	...	...	...	...
Waterloo	4,256	6	....	0	0	2	...	...	...	...
Seneca Falls	6,519	11	....	1	0	3	...	...	...	...
GENEVA	10,433	17	....	0	1	5	...	...	...	...
Canandaigua	6,151	7	....	2	0	2	...	...	...	...
Manchester	4,733	6	....	0	0	3	...	...	...	...
Phelps	4,788	4	....	0	0	2	...	...	...	...
Penn Yan	4,650	14	....	0	0	4	...	1	...	...
Batavia	9,180	6	....	1	0	1	...	...	...	...
Dansville	3,633	3	....	0	0	0	...	...	...	...
Le Roy	3,144	3	....	0	0	0	...	...	...	...
Warsaw	4,341	4	....	0	1	2	...	...	...	...
Rest of District	206,500	220	13.0	23	4	89	...	1	...	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	915,000	967	13.0	108	60	222	7	10	...	...
BUFFALO	380,000	365	11.7	45	28	64	5	2	...	...
TONAWANDA	7,421	10	....	1	0	2	...	...	...	...
Amherst	4,223	2	....	0	0	0	...	...	...	...

FOR JUNE—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
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...	...	...	...	...	...	1	1	...	...	1	1	1	5	3	1	4	2	...
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...	1	1	...	6	...	28	10	7	1	27	25	54	37	24	15	24	9	24
4	8	...	1	5	4	45	37	13	6	40	40	88	62	19	25	30	21	37
4	1	...	...	4	2	15	8	4	1	11	11	21	14	9	5	6	6	10
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...	2	...	...	...	...	...	1	1	...	2	1	2	4	...	2	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
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...	...	...	...	...	...	9	...	...	...	...	...	...	2	...	...	1	1	...
...	5	...	1	1	2	17	25	6	3	20	26	47	36	7	13	19	12	22
...	2	2	1	2	4	42	15	6	3	21	28	52	66	18	23	28	15	26
...	...	...	...	...	2	5	1	...	...	2	5	4	6	1	4	4	1	3
...	1	...	...	...	...	2	2	...	...	1	1	2	2	2	...	1	1	1
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...	...	...	...	...	...	3	2	...	1	1	1	...	3	...	2	1	1	1
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...	1	2	1	1	2	26	9	2	2	14	15	34	41	10	13	18	8	20
3	2	1	2	20	21	92	43	35	8	72	75	126	137	50	81	60	43	79
1	1	...	...	7	9	39	16	19	2	30	27	48	46	18	30	16	23	26
...	...	...	...	...	...	1	...	...	...	1	1	...	2	...	...	2	1	2
...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC			
							Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Con.*)										
NORTH TONAWANDA	9,069	8	....	3	0	3	...	...	...	...
LOCKPORT	16,581	22	....	2	2	5	...	1	...	...
NIAGARA FALLS	25,000	29	14.2	6	0	2	1	1	...	...
Medina	4,716	10	....	1	1	2	...	...	...	...
Albion	4,477	3	....	0	0	2	...	...	...	...
Brockport	3,400	......	....	0	0	0	...	...	...	...
ROCHESTER	165,000	207	15.0	18	10	39	...	3	...	...
Palmyra	3,758	7	....	1	0	3	...	...	...	...
Newark	4,578	7	....	0	2	0	...	...	...	...
Lyons	5,824	4	....	0	0	3	...	...	...	...
Clyde	2,507	1	....	1	0	0	...	...	...	...
OSWEGO	22,200	26	14.3	2	2	5	...	1	...	...
FULTON	8,734	4	....	1	1	2	...	...	...	...
Richland	3,535	6	....	0	0	2	...	...	...	...
Rest of District	244,184	256	12.5	27	14	88	1	2	...	...
Totals for the State	7,746,000	10,997	17.2	1,770	1,127	1,668	242	78	14	2
Average for past five years	....	9,422	15.5	......	*2,790	1,482	43	80	20	31

* All deaths under 5 years of age.

REMARKS—There was little deviation from the normal in the temperature during the month and much uniformity in all parts of the State, the mean being a little exaggerated by heated weather during the last week with highest range of about 90 degrees, offset partly by subnormal temperature during the second week with lowest range of 45 degrees. The highest mean temperature for June in the past 30 years has been 70 degrees, or 3 degrees higher than the present, and the lowest 62 degrees which is 5 degrees lower than the present. The average of the mean maximum temperature this month of all the stations is 71 degrees, of the mean minimum, 57 degrees. The accumulated deficiency in temperature since January is 440 degrees. There were from 10 to 15 days at the different stations on which rain fell and 8 to 13 clear days, the rainfall being about the normal or slightly deficient. There is an accumulated deficiency in precipitation in the east and an excess in the west part of the State. The mean barometer was slightly higher than in May; the humidity was 75 per cent. South and in the western part of the State southwesterly winds prevailed, generally moderate, with maximum velocity of 20 to 40 miles an hour.

JUNE MORTALITY—June, next to November, is uniformly the month of lowest mortality in this State. There have been periods of years in which the average has shown October to have had the second place by a small difference, but year by year June almost always has fewer deaths than any other month except November. Taking the average of the last five years there were 9,130 deaths in November and 9,422 in June; the average of ten years, 1885–1895, in November 7,627 deaths occurred, and in June, 8,286. With a death rate for the year of 17.5 per 1,000 population, there has been one of 15.0 for November and of 15.8 in June. Of these deaths, 943, or 10.3 per cent., have been from infectious diseases in November, against 1,280, or 13.6 per cent., in June. The higher mortality from these causes has been in diarrheal diseases, which begin in June to have a material increase and are double those of November, and measles causes more deaths always in the first half of the year than in the last; while on the other hand November has more deaths from typhoid fever and diphtheria. The deaths from consumption are identical in the two months. There is always a large fall in the mortality for pneumonia in June, the total of acute respiratory then for the first falling below 1,000, while in November there is an increase. This increase was somewhat less marked in the years prior to the grippe epidemics commencing in 1898, but the difference is not as marked as would be anticipated, although November is generally too early to be much impressed by the annually recurrring epidemics of influenza, their force having been likewise spent by June. Of other local diseases, those of the digestive system cause more deaths in June than in November, as it is generally the case that these deaths increase with the increase of the diarrheal mortality. The same is to some extent true with the nervous system. The mortality of early life is at its highest in the summer months, but in June for recent years the increase over the preceding months is slight, 25 to 30 per cent. of the deaths occurring under five years of age, and in November, 23 per cent. The infant mortality is very much less than it was in former years, for in the first decade of our records 40 per cent. of the June deaths were under the age of five years, while in July more than half the deaths were of this age; in the last decade 30 per cent. in June and 42 per cent. in July, the difference in the last five years

FOR JUNE—(*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
...	...	...	...	...	1	.....	1	1	...	1	1	1	1	...	1	...	.....	.....
...	...	...	...	...	.....	1	2	1	1	1	2	2	5	...	1	...	3	2
...	...	...	...	1	1	1	1	1	...	3	.....	2	4	1	4	1	2	5
...	...	...	...	...	1	.....	1	.....	1	.....	2	1	.....	1	....	2	.....	1
...	...	...	...	...	.....	.....	.....	.....	...	.....	.....	1	.....	1	....	1	.....	.....
...	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	.....	...	....	...	.....	.....
2	1	...	...	3	4	27	11	4	2	17	17	20	31	18	20	12	4	11
...	...	...	...	...	.....	1	.....	1	...	.....	.....	.....	2	...	....	...	2	1
...	...	...	...	1	.....	.....	1	.....	...	.....	1	1	.....	...	1	...	1	1
...	...	...	...	...	.....	.....	.....	.....	...	.....	.....	1	2	...	....	1	.....	.....
...	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	.....	...	....	...	.....	1
...	...	...	...	2	2	2	2	1	...	1	1	5	4	1	1	2	.....	1
...	...	...	...	...	.....	.....	1	.....	...	.....	1	.....	1	...	....	...	.....	1
...	...	...	...	...	.....	.....	.....	.....	...	1	.....	1	2	...	1	1	.....	.....
...	...	1	2	6	3	20	7	7	2	17	21	42	37	10	22	22	7	27
90	130	24	33	250	544	1,136	505	502	96	562	818	1,008	1,095	410	1695	331	470	962
99	104	31	71	243	562	1,033	.....	†949	85	697	736	904	1,000	416	652	361	.....	‡1,305

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

being still more marked. The average annual number of deaths under five years of age in the first decade was 3,300 in June and 5,800 in July; in the last five years it was 2,800 in June and 4,380 in July, the population of the State having meanwhile largely increased. The deaths of old age are fewest as those of infancy are highest, and fewer occur beyond the age of seventy in June than in November.

THE CURRENT JUNE MORTALITY amounts to about 11,000 and is 1,500 in excess of the average of the past five years. This increase is in large part due to the great increase in the deaths reported by New York City, which returns 1,362 deaths from *accident*, a large part of which are due to the "Slocum" disaster, which added to the mortality of the month more than 1,000 deaths. In June, 1903, there were 309 deaths from accidents and violence in New York City, which was half the number for the entire State. The deaths from this cause always increase in the summer months, the increase being largely due to drowning.

Aside from this extraordinary contribution to the mortality of the month, the present June mortality is excessive as compared with that of last year or of the past five years. Of epidemic diseases the only increase is in deaths from cerebrospinal meningitis in New York City, which became epidemic there in March and reached its height in May, the deaths from it in June being the same as in April. This has added 200 deaths to the average mortality from this cause. There is also a more general prevalence of measles than a year ago, and this also has increased mainly in New York City. With these exceptions the epidemic mortality, the total of which is not largely increased by them, does not differ from the average. The diarrheal deaths are a few under the average for the month (it should be noted that this year the diarrheal deaths under five years of age are reported, and it will be interesting to note the effect of this on the comparative reported mortality from this cause, which heretofore has been made to include all acute diarrhœal mortality).

SMALLPOX continues in a few localities, with two deaths in New York City. It is still from time to time a source of investigation, and outbreaks are overlooked by attending physicians.

CONSUMPTION has caused an excessive mortality for June. This is general throughout the State. There were almost as many deaths as in May and 150 more than in June last. While the deaths from consumption vary from month to month to but a moderate degree, it is usual for a material reduction to occur in June and continue through September. This year, following months of very excessive mortality, the conditions controlling disease of the preceding winter and spring months continue. The prevalence of influenza and its allied or resultant affections, which have characterized the disease movements earlier in the year, has, so far as reports of it as a cause of death are concerned, largely abated, for only few deaths were returned in June with this given as a contributing cause of death. It is however evident that its sequences have continued and the increase in pulmonary consumption is attributable to it. Deaths from pneumonia and other acute respiratory diseases, which more immediately accompany grippe, and which have been very high since January, are less than half as many as in May. Other local diseases, those of the urinary, circulatory and nervous systems, are also much reduced, though still above the average for June.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Ju

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1 000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT										
Totals	4,158,600	7,588	21.4	2,697	2,563	552	118	55	9	...
CITY OF NEW YORK:										
Totals	3,838,024	7,059	21.6	2,542	2,525	461	111	50	9	...
BOROUGH OF MANHATTAN	1,940,121	3,603	21.3	1,280	1,982	175	76	17	4	...
BOROUGH OF THE BRONX	294,939	498	20.0	157	207	45	7	4	3	...
BOROUGH OF BROOKLYN	1,334,952	2,462	21.6	915	286	193	25	25	1	...
BOROUGH OF QUEENS	193,494	333	20.2	122	31	35	2	1	1	...
BOROUGH OF RICHMOND	74,158	163	26.0	68	19	13	1	3	...	...
Oyster Bay	16,334	34	....	8	2	8	1	...	...	...
Hempstead	27,066	39	16.0	7	1	4	...	...	...	...
North Hempstead	12,048	21	....	6	0	2	...	1	...	...
Southold	8,301	5	....	0	0	1	...	...	...	...
Sag Harbor	3,500	2	....	0	0	1	...	...	...	...
Huntington	9,483	16	....	5	1	3	...	...	...	...
Brookhaven	14,592	25	....	2	2	8	...	...	...	...
YONKERS	50,000	91	21.5	46	6	8	2	1	...	...
Greenburg	15,564	32	....	9	1	4	...	...	...	...
MOUNT VERNON	20,346	32	18.5	16	0	6	...	1	...	...
Port Chester	7,440	16	....	11	4	0	1	...	...	...
Ossining	7,939	10	....	1	3	1	...	1	...	...
NEW ROCHELLE	14,720	27	....	10	1	2	2	...	...	...
Peekskill	10,358	21	....	5	6	0	...	...	...	...
White Plains	7,900	15	....	3	3	4	...	...	...	...
Rest of district	95,000	143	17.7	26	8	39	1	1	...	...
HUDSON VALLEY DISTRICT										
Totals	696,000	1,039	17.8	231	75	199	7	14	1	...
ALBANY	100,000	169	20.0	40	10	24	3	1	1	...
COHOES	24,000	35	17.5	10	3	2	...	...	...	...
TROY	75,057	144	22.5	43	9	24	1	1	...	...
WATERVLIET	14,321	23	....	9	4	0	...	...	...	...
Green Island	4,770	6	....	1	0	1	...	...	...	...
Hoosick Falls	5,671	8	....	1	1	1	...	...	...	...
RENSSELAER	7,466	8	....	1	1	2	...	2	...	...
Coxsackie	4,102	8	....	2	1	2	...	...	...	...
Catskill	5,486	9	....	4	2	0	...	...	...	...
HUDSON	9,528	15	....	2	2	4	1	1	...	...
KINGSTON	24,535	44	21.2	13	2	5	...	...	...	...
Ellenville	3,000	6	....	3	0	1	...	...	...	...
Marbletown	3,511	2	....	1	0	0	...	...	...	...
Rosendale	6,278	5	....	0	1	1	...	...	...	...
Esopus	4,907	8	....	3	0	0	...	1	...	...
Saugerties	3,700	6	....	2	0	0	...	1	...	...
POUGHKEEPSIE	24,029	31	15.2	6	4	7	...	1	...	...
Fishkill	13,016	24	....	4	0	6	...	...	...	...
Wappingers Falls	3,504	2	....	1	0	0	...	...	...	...
NEWBURGH	25,000	58	26.5	14	4	15	1	1	...	...
Port Jervis	9,385	10	....	5	0	2	...	...	...	...
MIDDLETOWN	14,522	23	....	2	2	7	...	...	...	...
Warwick	6,403	9	....	2	0	0	...	...	...	...
Goshen	4,564	6	....	2	1	3	...	...	...	...

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York ly, **1904.**

Roman type. Population estimated to date printed in full face figures.]

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
37	50	12	20	139	2,054	730	193	298	116	269	545	446	572	243	447	81	245	909
35	48	9	19	134	1,929	674	179	288	105	219	519	402	525	215	416	63	230	880
13	24	7	12	63	870	319	125	201	34	97	272	233	300	122	229	24	102	459
7	7	...	3	10	118	119	12	8	1	11	30	14	31	9	32	6	15	51
13	17	2	4	55	782	215	25	58	67	90	187	121	158	72	116	25	96	308
2	...	...	...	3	106	10	10	15	3	18	21	28	29	5	25	6	16	32
...	...	...	...	3	53	11	7	6	...	3	9	6	7	7	14	2	1	30
...	1	...	...	...	4	4	2	2	1	3	1	4	4	2	1	2	...	2
...	...	...	1	1	4	2	...	...	1	6	3	3	7	3	4	1	1	2
...	...	...	...	1	5	1	...	...	1	2	1	1	...	4	1	1	1	1
...	...	...	...	...	...	...	...	...	...	1	1	...	...	2	1	1	...	...
...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...
...	...	1	...	...	4	1	...	...	...	2	1	4	2	...	...	...	...	...
...	...	...	...	1	3	2	1	1	...	3	1	7	1	1	...	3	1	...
1	...	1	...	...	30	7	...	2	...	11	5	1	15	4	3	...	2	6
...	...	...	...	...	8	...	...	...	...	2	3	4	4	1	6	1	1	2
...	...	1	...	...	11	1	1	...	...	4	...	1	3	2	1	1	2	3
...	1	...	...	...	10	...	...	...	...	2	...	...	...	...	1	...	...	1
...	...	...	...	...	4	1	...	...	...	...	1	1	...	...	1	...	1	...
...	...	...	...	...	6	1	1	...	...	2	2	3	5	...	3	...	...	2
...	...	...	...	...	9	3	...	1	1	2	...	...	2	1	1	...	1	...
...	...	...	...	...	4	2	1	...	...	1	...	2	...	...	1	2	...	2
1	...	...	...	2	23	31	8	4	7	9	7	12	4	8	6	6	5	8
1	4	...	3	18	124	114	29	16	3	101	72	108	113	46	67	38	42	118
1	...	...	...	2	19	20	10	3	...	20	13	13	14	7	8	4	10	20
...	...	...	...	...	7	7	...	...	...	3	3	3	3	...	...	1	4	6
...	...	...	...	...	29	18	3	3	1	20	4	10	15	5	3	3	6	2
...	...	...	...	...	9	2	...	...	...	1	2	2	3	1	...	...	...	3
...	...	...	...	...	...	2	...	...	...	1	...	...	1	...	1	...	1	...
...	...	...	...	...	1	2	...	...	...	...	...	2	...	1	...	1	...	1
...	...	...	...	1	...	2	...	...	...	2	...	...	...	...	...	...	...	1
...	...	...	...	...	...	1	...	...	...	1	...	...	3	1	...	...	...	2
...	...	...	...	...	4	...	...	...	...	...	...	1	...	...	2	...	1	1
...	...	...	...	...	1	...	...	...	...	1	2	2	1	...	3	1	1	1
...	...	...	2	2	7	2	1	...	...	6	4	...	3	5	6	1	...	5
...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	1	...	3
...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...
...	...	...	...	...	...	1	...	1	...	1	...	1	1	...	...	...	...	...
...	...	...	...	...	2	1	...	...	...	...	2	...	...	...	1	...	...	1
...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	2	1
...	...	...	...	1	2	3	1	3	...	3	3	...	2	3	3	2	...	4
...	...	...	...	1	2	1	...	...	...	1	2	2	6	1	4	2	...	2
...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1
...	...	...	...	3	8	1	3	...	2	8	4	9	2	3	4	2	1	6
...	...	...	...	1	...	...	...	...	...	1	...	...	...	1	1	1	...	5
...	...	...	...	...	1	3	...	1	...	2	3	2	4	3	1	1	1	1
...	...	...	...	...	...	2	...	1	...	...	1	1	1	1	...	...	...	2
...	...	...	...	...	1	...	...	...	...	2	...	...	3	...	...	...	...	...

SANITARY DISTRICTS.	Population	Total number of deaths.	Representing annual death-rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC			
							Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT—(*Con.*)										
Montgomery	5,939	10	....	3	0	2	...	...	...	...
Haverstraw	9,874	17	....	4	1	1	...	...	...	...
Nyack	4,275	5	....	0	1	0	...	...	...	...
Ramapo	7,502	10	....	5	0	3	...	...	...	...
Rest of District	271,800	338	15.0	48	26	86	1	5	...	...
ADIRONDACK AND NORTHERN DISTRICT										
Totals	395,000	429	13.0	71	21	107	3	6	...	...
WATERTOWN	21,700	30	16.3	3	1	6	1	...	...	...
Ellisburg	3,888	7	....	0	0	4	...	...	...	...
Cape Vincent	2,882	1	....	0	0	0	...	...	...	...
Clayton	4,313	4	....	0	0	0	...	...	...	...
OGDENSBURG	12,633	13	....	3	0	1	...	...	...	...
Gouverneur	6,000	9	....	0	0	3	...	...	...	...
Potsdam	3,843	1	....	0	0	1	...	...	...	...
Canton	6,387	9	....	1	1	4	1	...	...	...
Malone	5,935	7	....	1	0	3	...	...	...	...
PLATTSBURG	8,434	17	....	8	3	1	...	...	...	...
Glens Falls	12,613	21	....	6	0	1	...	1	...	...
Whitehall	4,377	2	....	0	0	1	...	...	...	...
Fort Edward	5,216	5	....	1	0	2	...	...	...	...
Sandy Hill	4,473	4	....	2	0	2	...	...	...	...
Granville	5,217	1	....	0	0	0	...	...	...	...
Greenwich	4,172	6	....	1	0	0	...	...	...	...
Lowville	3,746	8	....	1	0	4	...	...	...	...
Rest of District	279,000	284	12.0	44	16	74	1	5	...	...
MOHAWK VALLEY DISTRICT										
Totals	428,400	545	15.2	119	40	126	5	4	...	...
SCHENECTADY	56,000	72	15.0	35	9	6	1	1	...	...
Cobleskill	3,973	5	....	0	0	4	...	...	...	...
AMSTERDAM	20,929	43	24.0	16	7	7	1	...	...	...
Fort Plain	2,444	2	....	0	0	0	...	...	...	...
JOHNSTOWN	10,130	5	....	0	0	3	...	...	...	...
GLOVERSVILLE	18,349	17	....	2	2	2	...	...	...	...
LITTLE FALLS	10,381	8	....	0	0	1	1	...	...	...
Herkimer	5,555	10	....	1	2	1	...	...	...	...
Ilion	5,138	8	....	0	1	1	...	...	...	...
UTICA	56,383	101	20.5	31	10	18	1	1	...	...
Whitestown	6,235	8	....	4	0	0	...	...	...	...
ROME	15,343	25	....	1	3	4	...	...	...	...
Boonville	3,332	7	....	0	0	4	...	...	...	...
Camden	3,745	11	....	3	0	4	...	...	...	...
Waterford	6,157	4	....	1	0	2	...	...	...	...
Mechanicville	4,695	7	....	1	0	4	...	...	...	...
Ballston Spa	3,923	11	....	1	0	4	...	...	...	...
Saratoga Springs	12,409	22	....	1	0	5	...	...	...	...
Rest of District	183,250	179	12.0	22	6	56	1	2	...	...
SOUTHERN TIER DISTRICT										
Totals	433,000	479	13.2	64	20	140	...	13	...	...
BINGHAMTON	40,000	79	23.0	19	6	15	...	1	...	...
Owego	5,039	5	....	1	0	2	...	...	...	...
Candor	3,330	3	....	0	0	1	...	...	...	...
Waverly	4,500	1	....	0	0	0	...	...	...	...
ELMIRA	35,672	55	18.2	9	3	9	...	3	...	...

FOR JULY—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
...	...	...	...	1	1	2	...	...	...	...	1	1	1	1	...	...	...	2
...	1	...	...	...	1	1	1	...	...	2	3	...	1	...	5	...	...	2
...	...	...	...	1	1	2	...	...	...	1	...	...	...	...	...	...	...	...
...	...	...	...	1	2	1	...	...	...	...	...	1	2	...	...	...	...	3
...	3	...	1	4	25	37	10	4	...	25	25	55	47	13	25	18	15	25
4	1	1	3	3	16	43	8	5	5	38	21	58	57	10	42	28	30	47
...	...	...	...	1	...	3	2	...	1	5	...	1	8	1	...	2	3	2
...	...	...	...	...	...	...	...	...	...	...	...	...	4	...	1	2	...	...
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	2	...	1	...
...	...	...	...	...	1	4	1	...	1	...	...	1	2	...	1	...	1	1
...	...	...	...	...	...	...	...	...	...	...	1	2	1	2	2	1	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...
...	...	1	...	...	...	1	...	1	...	1	...	2	1	...	...	1	...	...
...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	2	1	...	2
3	...	...	...	...	4	...	1	...	...	...	...	1	3	...	2	1	...	2
...	...	...	...	...	2	...	...	1	...	3	1	3	1	1	2	...	2	4
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	1	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	...	1	...	1
...	...	...	...	...	2	...	...	...	...	1	...	1	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	1	...	...	2	...	1	...	1	1
...	...	...	...	...	...	1	1	...	...	...	...	1	1	...	...	1	2	1
1	1	...	3	2	7	33	3	3	3	25	17	43	33	6	28	17	20	33
2	3	...	4	•8	69	50	13	8	7	54	39	66	54	20	40	31	19	49
...	1	...	1	2	29	4	...	...	...	5	5	4	7	1	1	1	1	8
...	...	...	...	...	...	2	...	...	...	...	...	1	1	...	...	1	...	...
...	...	...	1	...	13	3	1	1	...	4	2	1	4	2	3	1	2	4
...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	2	2	1	...	...	...	...
...	...	...	...	1	2	1	1	1	1	...	1	3	2	...	1	1	1	1
...	...	...	...	...	...	2	...	...	...	1	...	3	...	...	1	...	...	...
...	...	...	...	...	1	1	...	1	1	2	...	...	2	1	1	...	...	...
...	...	...	...	...	1	...	...	...	...	1	2	2	1	...	...	...	1	...
2	1	...	1	2	16	10	4	2	1	9	5	12	9	1	11	3	1	9
...	1	...	...	...	2	...	...	...	1	...	...	...	2	...	1	...	...	1
...	...	...	...	...	1	6	...	...	...	5	1	5	3	...	1	1	1	1
...	...	...	...	...	...	...	...	...	...	...	1	3	1	...	...	...	...	2
...	...	...	...	1	...	...	...	...	...	...	...	1	4	...	...	...	...	5
...	...	...	...	...	...	2	...	...	...	1	...	...	...	...	...	...	...	1
...	...	...	...	...	1	...	...	...	...	1	1	1	...	1	1	1	...	...
...	...	...	...	...	1	...	...	1	...	1	2	2	1	...	...	2	1	...
...	...	...	...	...	...	4	...	...	...	1	3	5	2	1	3	...	...	3
...	...	...	1	2	2	15	7	2	3	22	15	21	13	12	16	20	11	14
3	6	3	...	8	31	32	9	6	6	47	39	61	74	23	41	35	13	31
...	...	1	...	4	16	2	3	...	1	6	5	5	12	5	4	5	3	6
...	...	...	...	...	...	...	...	...	...	1	...	1	3	...	...	...	...	...
1	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
...	...	...	...	1	7	4	1	...	1	5	9	5	5	3	5	...	2	4

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con*)										
Horseheads	5,000	8	18.2	0	0	1	...	...	...	...
HORNELLSVILLE	12,000	18	....	4	4	4	...	...	...	...
Bath	5,000	1	....	0	0	0	...	...	...	...
CORNING	11,061	15	....	3	0	3	...	1	...	...
Wellsville	5,000	10	....	2	1	3	...	...	...	...
OLEAN	9,462	4	....	0	0	2	...	1	...	...
Salamanca	4,251	7	....	2	0	0	...	1	...	...
DUNKIRK	15,000	11	....	2	2	4	...	1	...	...
JAMESTOWN	22,892	27	14.0	3	1	5	...	...	...	...
Westfield	2,430	4	....	0	0	2	...	...	...	...
Fredonia	4,125	3	....	0	0	0	...	...	...	...
Rest of District	248,600	231	11.0	19	3	89	...	5	...	...
EAST CENTRAL DISTRICT Totals	404,500	493	14.4	62	19	152	4	8	...	...
SYRACUSE	110,000	159	17.0	33	10	21	1	1	...	...
Baldwinsville	3,000	2	....	0	0	1	...	...	...	...
DeWitt	5,435	6	....	2	1	0	...	...	...	...
CORTLAND	9,014	16	....	3	0	5	...	...	...	...
Homer	2,381	6	....	0	0	2	...	...	...	...
ONEIDA	7,942	5	....	0	0	1	...	...	...	...
Hamilton	3,744	4	....	0	0	2	...	...	...	...
Cazenovia	3,830	11	....	2	1	2	...	...	...	...
Canastota	3,300	3	....	0	0	1	...	...	...	...
Norwich	5,766	10	....	0	0	3	1	...	...	...
Oneonta	7,147	5	....	0	0	1	...	...	...	...
Worcester	2,409	3	....	0	0	2	...	...	...	...
Cooperstown	2,363	4	....	0	0	3	...	...	...	...
Walton	4,869	5	....	0	0	1	...	...	...	...
Delhi	3,243	3	....	1	0	1	1	...	...	...
Liberty	4,568	14	....	0	0	0	...	...	...	...
Rest of District	225,540	237	12.0	21	7	106	1	7	...	...
WEST CENTRAL DISTRICT Totals	320,600	319	12.0	31	11	111	...	5	...	...
AUBURN	35,000	40	13.5	3	3	11	...	1	...	...
ITHACA	13,136	17	....	1	1	4	...	...	...	...
Hector	4,137	......	....	......	......	......	...	...	...	...
Waterloo	4,256	4	....	0	0	3	...	...	...	...
Seneca Falls	6,519	4	....	0	0	0	...	...	...	...
GENEVA	10,433	13	....	2	0	5	...	...	...	...
Canandaigua	6,151	9	....	1	0	1	...	1	...	...
Manchester	4,733	3	....	0	0	2	...	...	...	...
Phelps	4,788	4	....	0	0	1	...	...	...	...
Penn Yan	4,650	2	....	0	0	1	...	1	...	...
Batavia	9,180	12	....	2	0	2	...	...	...	...
Dansville	3,633	4	....	1	0	2	...	...	...	...
Le Roy	3,144	7	....	1	1	2	...	...	...	...
Warsaw	4,341	5	....	1	0	2	...	...	...	...
Rest of District	206,500	195	11.0	19	6	75	...	2	...	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	915,200	1,166	15.2	259	84	228	3	19	...	1
BUFFALO	380,000	541	16.8	171	55	59	3	12	...	...
TONAWANDA	7,421	6	....	2	0	2	...	...	...	...
Amherst	4,223	7	....	2	0	1	...	...	...	...
NORTH TONAWANDA	9,069	12	....	3	1	3	...	...	...	...
LOCKPORT	16,581	20	....	5	0	2	...	...	...	...

for July—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
						2				1				1	2	1	1	
	5					2				2	1	1	1	1	1		1	3
													1					
				1	1	1		1		2	1	1	2		1	1		2
	1							1			1	2	1			3		1
									1		1		1					
									1			1			2			2
1					1					3		1	2		2			
					1	4	1	2	1	3	6	2	2		2	1		2
						1				1		1			1			
						1			1			1						
1		2		2	5	16	4	2		23	15	40	41	13	21	24	6	11
3	2	1		3	15	58	14	7	2	40	34	66	62	34	38	40	16	46
3	1			1	11	15	4	4	1	16	10	17	20	15	12	2	7	18
											1	1						
					1	1	1			1					1		1	
						1	2			2		1	2	1	1	2		4
											1	1	1	3				
						1	1			2					1			
											3				1			
						1	1					2	2	1	2			2
						1	1								1			
						1			1	1	2	1	1			1		1
						2					1		1		1			
											1	1				1		
												2	1			1		
													2		1	1		1
												1						1
						11								1	2			
	1	1		2	3	24	4	3		18	15	39	32	13	15	32	8	19
1			1	4	7	19	7		2	33	39	41	47	20	24	26	18	25
1				2	2	3	2			4	6	2	6	3	4	1	1	2
						1	1				2	2	2	1	2	2	3	1
										2	1	1						
												1	1	1			1	
					1					2	2	1	1		2	1	1	2
					1								3	1	3			
											2		1					
						1							1	1	1			
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									1		2	1	1		2	1	1	3
											1	1				1		1
							2			1		3		1				
												1		1		1	1	1
			1	2	3	14	2		1	24	23	28	31	11	10	18	10	15
1	5	4	1	24	163	99	29	36	3	95	52	123	138	64	84	70	63	89
	5	3	1	7	121	44	11	26	1	40	17	42	56	21	34	14	35	48
					1	1								1	1	1		1
					2	2				2			1					
						1	1			1	2		3	1	1	1	1	
				2	2	3				2		3	1	1	3		8	

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*).										
NIAGARA FALLS	25,000	28	13.2	12	0	4	...	1	...	1
Medina	4,716	3	....	1	0	0	...	...	...	...
Albion	4,477	6	....	1	0	3	...	...	...	...
Brockport	3,400	2	....	0	0	1	...	...	...	...
ROCHESTER	165,000	202	14.5	12	12	43	...	3	...	...
Palmyra	3,758	6	....	3	0	2	...	...	...	...
Newark	4,578	8	....	1	0	2	...	...	...	...
Lyons	5,824	5	....	1	0	1	...	...	...	...
Clyde	2,507	.....	....	.....	.....	.....	...	...	...	...
OSWEGO	22,200	22	12.0	6	1	4	...	2	...	...
FULTON	8,734	12	....	1	0	4	...	...	...	...
Richland	3,535	7	....	1	0	5	...	...	...	...
Rest of District	244,184	279	13.6	37	15	92	...	1	...	...
Totals for the State	7,746,500	12,061	18.5	3,534	2,833	1,615	140	124	10	1
Average for past five years	....	11,460	18.5	*4,379	......	1,632	49	105	21	25

* All deaths under 5 years of age.

REMARKS—With southerly and southwesterly winds of moderate force, showing maximum velocities from 25 to 40 miles in the hour; high range of barometer, moderate humidity, rainfall not far from the normal and an average temperature for the State of 70 degrees, there is not much variation from the weather of last July. Highest temperatures occurred in the east and south part of the State above 90 degrees on the 19th and were most marked during the middle of the month, the first week of the month being cold; the mean temperature for the month was two degrees subnormal. The rainfall was excessive in the central part of the State and elsewhere deficient with from 15 to 20 days on which there was at least a trace of precipitation, 22 days being partly cloudy and 9 clear. The highest mean temperatures in 30 years (this year 70 degrees) have been from 70 to 78 degrees at reporting stations and the lowest 65 to 70 degrees.

JULY HEALTH CONDITIONS—This month follows one which is almost the healthiest in the year in this State, having next to November the lowest mortality of any month in the year. July on the other hand has uniformly the highest death rate of the year. With an average June mortality of 9,500, that of July is 11,500. This abrupt increase is in four classes of causes of death; those from acute diarrheal diseases, chiefly, and from diseases of the digestive and nervous systems, and from accidents and violence. These more than account for it, since other infectious diseases are lessened in their mortality and there is a considerable decrease in all acute respiratory diseases.

The infant mortality is always at its highest in July. Of 35,660 deaths under five years of age in the year, 4,380 occurred in July—the average of the past five years, or over 13 per cent. During the past ten years there has been a large decrease in deaths at this age. Prior to 1895 these deaths were never less than 50 per cent. of the total in July; since, they have steadily decreased each year and for the last three years have been but 35 per cent. of the deaths at all ages. This year, however, there has been an increase even beyond the records of earlier years, 53 per cent. of the deaths of the current month having occurred under the age of five years; the 6,367 deaths exceeding the number of any former year except 1892, when nearly 7,000 deaths occurred. Of these, 3,534 were under one year of age and 2,833 between one and five years of age. This excessive mortality was largely in New York city, where 5,000 deaths, or 70 per cent. of the total, were under five years of age.

Acute diarrheal diseases caused about 2,500 deaths under five years of age, an increase of 2,000 over June. It has been in this class of diseases that the saving in infant mortality in recent years has occurred chiefly. Prior to 1897, the diarrheal deaths in July were always in excess of 3,000; since then but little over 2,000. This year's record has been kept only of deaths from this cause occurring under five years of age. They, however, practically include all the acute diarrheal mortality, since there were but 70 deaths above these ages reported in 4,000 deaths from all causes, or probably 200 in the entire State, and most of these occurred at advanced age. About half of the 70 were returned from dysentery, and the rest from entero-colitis and cholera morbus. Of the infant deaths, cholera infantum

FOR JULY—(*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	...	1	7	1	1	......	...	3	1	1	2	1	1	1	1	5
....	...	...	...	...	.....	.....	1	......	...	.....	1	....	1	...	.....	...	.....	......
....	...	...	...	...	.....	.....	.....	......	...	1	...	....	.....	2	.....	2	.....	1
....	...	...	...	1	.....	.....	.....	......	...	.....	...	....	.....	...	.....	1	.....	......
1	...	1	...	6	8	22	8	3	1	20	7	28	25	18	18	16	11	6
....	...	...	...	...	.....	.....	.....	......	...	1	...	1	1	...	.....	2	.....	1
....	...	...	...	...	.....	2	.....	......	...	.....	1	2	3	...	.....	...	.....	......
....	...	...	...	...	.....	.....	.....	1	...	.....	...	....	.....	2	1	1	.....	......
....	...	...	...	...	.....	.....	.....	......	...	.....	...	....	.....	...	.....	...	.....	......
....	...	...	...	1	1	1	.....	......	...	.....	1	2	7	...	1	1	1	4
....	...	...	...	...	1	2	.....	......	...	.....	1	2	2	2	1	...	.....	1
....	...	...	...	...	.....	.....	.....	......	...	.....	2	....	2	...	.....	1	1	1
....	...	...	...	6	20	20	7	6	1	25	19	42	34	15	23	29	10	21
52	71	21	32	207	2,479	1,146	302	376	144	677	841	969	1,117	460	783	349	446	1,314
71	80	20	95	187	2,047	1,056	.....	†735	81	950	762	864	1,046	432	1,036	390	.....	‡1,408

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

is given as the cause of death in fully one third of the cases and the rest as enteritis, entero-colitis, with a few simply returned as summer diarrhea. The diarrheal deaths were from 27 per cent. of all deaths in the Maritime district to 4 per cent. in the Adirondack and Northern, and constituted one fifth of the month's mortality.

Smallpox, during the month, has occurred chiefly in Yates county, with Dresden as a centre, and in several towns in Washington and Warren counties, with a few cases, generally single ones, at other points. At both of these central points it was imported from without the State and from both it has been distributed elsewhere.

GUIDE TO THE DIAGNOSIS OF SMALLPOX.—Although it is six years since smallpox of the mild abortive type has prevailed all over this State, and medical literature has abounded in descriptions of it and its variations from the accepted type of the textbooks, we still meet with frequent failure in its recognition. Why it is so generally mild, and even after the lapse of years of domestication, continues to generally breed true to the type, is less important than to accept the fact that it is smallpox; and it is certain that it is, because: It is an infectious disease to which those who have had smallpox or effective vaccination are immune; it has the general characteristics of smallpox; and it sometimes communicates unmodified smallpox. Being mild it is overlooked, and persons having it, unconsciously, carry it from place to place, so spreading it throughout a community so that it stays there a long time unrecognized, or transport it to other localities. But it is largely because medical men overlook it that it fails of recognition.

Occasionally cases will occur in which the diagnosis is uncertain and in all such there should be a quarantine until the doubt is settled, as it can be in a few days. Disregarding the fanciful or commonplace names which are given it, which almost always a little reflection will cause to be rejected, as for instance scabies or impetigo and like diseases that never prevail epidemically in the fashion of this disease, as a moderate knowledge of them will show, the chief trouble is with the diagnosis of it from chickenpox. The following simple aids to diagnosis were printed in 1899 and sent to health officers, and it is still timely to reprint them here since from time to time the need of them develops even yet:

"Note these data to aid you in diagnosis: If an adult; if the initial fever is marked and lasts three days, subsiding as the eruption appears; if the eruption comes first on the face and is most abundant there; and if there is any induration of the lesion, as of a papule having become vesicular, all of these or any modification of them are quite conclusive of smallpox. No adult should be allowed at large with an eruption thought to be that of chickenpox; no case of vesicular exanthem, preceded by marked fever, though the fever may have no characteristics differing from that of a severe or mild cold; no vesicular eruption so starting and coming mostly on the face, wrists (and frequently on the palms) is likely to be anything but smallpox; and if there is any induration of the base of vesicular lesions appreciable to touch with the tip of the finger, all of these are to be held as conclusive symptoms. In every case give the benefit of doubt to the public, for there will be some cases in which diagnosis will, for a little time, be difficult. Where several cases have occurred the difficulties of diagnosis will be lessened."

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Au

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT										
Totals	4,158,600	6,594	18.5	2,025	847	521	97	89	9	2
CITY OF NEW YORK										
Totals	3,838,024	5,993	18.4	1,845	796	429	92	84	9	2
BOROUGH OF MANHATTAN	1,940,121	3,170	18.7	1,013	374	193	68	37	2	1
BOROUGH OF THE BRONX	294,939	458	18.3	89	131	33	7	4	2	...
BOROUGH OF BROOKLYN	1,334,952	1,929	17.0	575	258	167	11	38	4	1
BOROUGH OF QUEENS	193,494	290	17.6	107	22	20	6	4	...	...
BOROUGH OF RICHMOND	74,158	146	23.3	61	11	16	...	1	1	...
Oyster Bay	16,334	34	....	18	3	3	...	...	...	...
Hempstead	27,066	32	14.0	12	1	4	...	...	...	...
North Hempstead	12,048	20	....	10	0	2	...	1	...	...
Southold	8,301	4	....	0	1	1	...	...	...	...
Sag Harbor	3,500	3	....	1	0	0	...	...	...	...
Huntington	9,483	18	....	8	1	2	...	...	...	...
Brookhaven	14,592	18	....	4	2	6	...	1	...	...
YONKERS	50,000	99	23.5	28	14	10	4	...	...	...
Greenburg	15,564	25	....	7	1	3	...	...	...	...
MOUNT VERNON	20,346	36	20.7	14	7	2	...	1	...	...
Port Chester	7,440	12	....	6	2	0	...	1	...	...
Ossining	7,939	17	....	8	0	4	...	...	...	...
NEW ROCHELLE	14,720	28	....	5	2	7	...	...	...	...
Peekskill	10,358	30	....	8	2	5	...	...	...	...
White Plains	7,900	11	....	4	1	3	...	...	...	...
Rest of District	95,000	214	26.5	47	14	40	1	1	...	...
HUDSON VALLEY DISTRICT										
Totals	696,000	1,028	17.2	199	68	235	9	10	4	...
ALBANY	100,000	161	19.0	24	8	30	4	2	...	...
COHOES	24,000	34	16.7	4	2	2	...	...	...	...
TROY	75,057	125	19.5	30	9	13	...	2	...	...
WATERVLIET	14,321	12	....	2	2	1	...	...	...	...
Green Island	4,770	7	....	1	1	3	...	...	...	...
Hoosick Falls	5,671	9	....	3	0	1	...	...	...	...
RENSSELAER	*10,000	10	....	1	2	2	...	...	...	...
Coxsackie	4,102	4	....	0	0	1	...	...	...	...
Catskill	5,486	8	....	2	0	1	...	...	...	...
HUDSON	9,528	13	...	3	0	3	1	1	...	...
KINGSTON	24,535	32	15.5	12	4	6	...	...	...	...
Ellenville	3,000	5	....	2	0	1	...	...	...	...
Marbletown	3,511	2	....	0	0	1	...	...	...	...
Rosendale	6,278	6	....	2	0	2	...	...	1	...
Esopus	4,907	2	....	0	0	1	...	...	...	...
Saugerties	3,700	10	....	1	1	1	...	...	...	...
POUGHKEEPSIE	24,029	35	16.7	8	3	10	...	...	...	...
Fishkill	13,016	18	....	2	3	2	...	...	...	...
Wappingers Falls	3,504	3	....	0	0	2	...	...	...	...
NEWBURG	25,000	43	20.2	6	6	3	2	1	...	...
Port Jervis	9,385	13	....	3	2	2	...	...	...	...
MIDDLETOWN	14,522	20	....	4	3	5	...	...	...	...
Warwick	6,403	8	....	3	1	2	...	...	...	...
Goshen	4,564	5	....	1	0	3	...	...	...	...

*** The population of Rensselaer was increased in 1902 by the addition of Bath-on-the-Hudson to 10,000.**

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York *gust,* 1904.

Roman type. Population estimated to date printed in full face figures.]

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years.)	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
15	**25**	**12**	**22**	**119**	**1,394**	**705**	**205**	**280**	**51**	**237**	**471**	**492**	**375**	**255**	**401**	**66**	**311**	**961**
14	**23**	**12**	**19**	**113**	**1,274**	**652**	**189**	**274**	**50**	**152**	**444**	**445**	**307**	**231**	**364**	**49**	**289**	**905**
7	15	8	13	53	641	315	108	182	22	44	243	235	117	135	183	19	200	522
4	1	...	1	9	68	119	8	9	8	8	34	31	29	11	32	4	13	56
3	7	3	3	40	443	189	61	72	15	84	141	155	114	69	117	23	70	266
...	...	1	2	5	79	21	7	8	4	13	16	15	34	10	23	2	5	35
...	...	...	...	6	43	8	5	3	1	3	10	9	13	6	9	1	1	26
...	...	...	...	...	12	2	1	1	...	4	...	1	1	1	1	1	1	8
...	...	...	...	...	7	2	...	1	...	5	3	3	4	1	1	...	2	3
...	...	...	...	1	6	2	...	...	...	2	...	1	1	1	1	1	...	3
...	...	...	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	1
...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	1
...	...	...	...	...	7	1	1	...	...	1	...	3	...	1	1	1	1	1
...	...	...	...	...	2	...	...	...	...	3	2	1	4	1	...	1	...	3
...	...	...	...	3	19	15	6	2	1	11	1	5	16	3	8	1	6	6
...	...	...	...	...	5	1	...	...	...	6	1	1	1	1	5	2	2	...
...	1	...	1	2	8	2	...	...	...	3	4	2	2	1	1	2	1	5
...	1	...	...	...	5	...	...	...	...	...	1	1	1	...	1	...	...	1
...	...	...	...	...	5	2	...	...	...	4	...	2	...	...	1	1	...	2
...	...	...	...	...	5	3	1	...	...	3	2	2	2	3	4	...	1	2
...	...	...	...	...	6	5	...	...	...	6	...	2	3	1	3	...	2	2
...	...	...	...	...	1	...	...	...	...	1	...	2	...	1	1	1	...	4
1	...	...	2	...	31	18	7	2	...	34	12	20	33	9	14	6	6	17
1	**3**	**1**	**5**	**9**	**139**	**97**	**20**	**11**	**4**	**116**	**81**	**108**	**125**	**53**	**73**	**45**	**44**	**70**
...	...	...	1	1	24	19	5	1	...	24	18	15	12	7	8	8	8	4
...	...	...	...	...	1	5	2	2	...	4	5	3	3	2	4	...	2	1
...	...	...	...	1	20	17	4	1	...	16	8	11	14	8	10	...	3	10
...	...	...	...	...	2	1	1	...	...	2	1	1	1	...	1	1	...	1
...	...	...	...	...	...	2	...	...	...	...	...	...	2	...	...	1	...	2
...	...	...	...	...	2	1	...	...	...	...	...	...	2	2	1	...	...	1
...	...	...	...	...	...	1	1	...	...	2	2	1	...	1	...	1	...	1
...	...	...	...	...	...	...	...	...	...	2	...	...	2	...	...	...	...	...
...	...	...	...	...	...	1	...	...	...	1	...	...	2	...	2	1	...	1
...	...	...	...	...	...	1	...	1	...	2	...	3	1	...	...	...	...	3
...	...	...	...	...	5	2	...	2	1	2	...	4	3	1	1	1	3	7
...	...	...	...	...	...	1	...	...	...	...	1	1	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...
...	...	...	...	...	1	...	1	...	...	...	...	1	1	1	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...
...	...	...	...	...	...	2	...	...	...	...	1	1	1	...	3	...	...	2
...	...	...	1	...	4	1	...	2	...	4	3	1	5	4	3	4	1	2
...	...	...	...	1	3	1	1	...	1	...	4	...	4	...	...	...	2	1
...	...	...	...	...	...	1	...	...	...	...	1	...	1	...	...	...	...	...
...	...	...	2	1	4	5	...	...	...	...	2	4	8	3	7	2	1	1
...	...	...	...	1	4	2	...	...	...	2	2	...	...	...	1	...	...	1
...	...	...	...	...	3	3	...	...	...	1	3	1	6	...	...	...	...	3
...	...	...	...	...	3	2	...	...	...	...	1	...	...	...	...	...	1	1
...	...	...	...	...	1	...	...	...	...	1	...	...	2	...	1	...	...	...

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Epidemic: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT—(*Con.*)										
Montgomery	5,939	19	....	6	1	4	...	...	...	...
Haverstraw	9,874	13	....	5	4	0	...	...	1	...
Nyack	4,275	9	....	1	0	1	...	...	...	...
Ramapo	7,502	16	....	7	1	4	...	...	...	...
Rest of District	271,800	386	17.0	66	15	128	2	4	2	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	437	13.0	86	25	106	...	6	...	...
WATERTOWN	21,700	34	18.4	10	0	6	...	...	...	...
Ellisburg	3,888	5	....	0	0	2	...	1	...	...
Cape Vincent	2,882	......	....	......	......	......	...	...	...	...
Clayton	4,313	4	....	0	0	0	...	...	...	...
OGDENSBURG	12,633	26	....	12	2	3	...	1	...	...
Gouverneur	6,000	9	....	2	3	1	...	...	...	...
Potsdam	3,843	4	....	0	0	3	...	...	...	...
Canton	6,387	7	....	1	0	3	...	...	...	...
Malone	5,935	3	....	0	0	1	...	...	...	...
PLATTSBURG	8,434	5	....	4	0	0	...	...	...	...
Glens Falls	12,613	13	....	3	2	0	...	...	...	...
Whitehall	4,377	11	....	2	2	2	...	...	...	...
Fort Edward	5,216	11	....	2	1	1	...	2	...	...
Sandy Hill	4,473	3	....	0	0	2	...	...	...	...
Granville	5,217	15	....	3	2	2	...	...	...	...
Greenwich	4,172	1	....	0	0	0	...	...	...	...
Lowville	3,746	5	....	0	0	1	...	1	...	...
Rest of District	279,000	281	13.0	47	13	79	...	1	...	...
MOHAWK VALLEY DISTRICT— Totals	428,400	555	15.5	121	49	120	3	7	...	...
SCHENECTADY	56,000	77	16.1	35	8	8	1	1	...	...
Cobleskill	3,973	3	....	0	0	1	...	...	...	...
AMSTERDAM	20,929	18	10.0	2	2	4	...	1	...	...
Fort Plain	2,444	1	....	0	0	0	...	...	...	...
JOHNSTOWN	10,130	15	....	2	0	4	...	...	...	...
GLOVERSVILLE	18,349	19	....	4	0	4	...	...	...	...
LITTLE FALLS	10,381	7	....	1	0	2	...	...	...	...
Herkimer	5,555	6	....	1	0	1	1	...	...	...
Ilion	5,138	5	....	2	0	2	...	...	...	...
UTICA	56,383	97	20.0	27	24	10	...	1	...	...
Whitestown	6,235	6	....	2	0	2	...	...	...	...
ROME	15,343	31	....	6	1	4	...	...	...	...
Boonville	3,332	7	....	0	0	2	...	...	...	...
Camden	3,745	1	....	0	0	1	...	1	...	...
Waterford	6,157	7	....	2	0	2	...	...	...	...
Mechanicville	4,695	10	....	5	1	3	...	...	...	...
Ballston Spa	3,923	3	....	1	0	1	...	...	...	...
Saratoga Springs	12,409	27	....	4	2	1	...	2	...	...
Rest of District	183,250	215	....	27	11	68	1	1	...	...
SOUTHERN TIER DISTRICT Totals	433,000	508	14.0	89	17	136	1	6	...	...
BINGHAMTON	40,000	46	12.5	11	1	7	...	...	...	...
Owego	5,039	5	....	0	0	1	...	...	...	...
Candor	3,330	2	....	0	0	0	...	...	...	...
Waverly	4,500	7	....	0	1	1	...	...	...	...
ELMIRA	35,672	41	13.5	10	1	10	...	1	...	...

FOR AUGUST—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	1				5					1		2	3	2	1	2	1	1
....					6						1		2	1	1			1
....	1				1	1					1	2		1	1		1	
....					6					2	1	3	1		1		1	1
1	1	1	1	4	44	28	5	2	2	50	26	51	48	20	27	24	20	23
....	...	...	1	4	38	40	5	6	4	54	26	56	44	28	27	25	13	60
....					1	3		1		7	2	3	5	3	2	1	1	5
....						1				1			2					
....																		
....										2		1					1	
....					4	1	1	1		2		2		2		2	1	9
....					2					2		1			1	1		2
....						1										3		
....					1					1	1	2	1		1			
....						1						1		1				
....					2	1		1										1
....					4				1	3		1						2
....				1	1					1	3	1	2		1			1
....					3	1				2	1		1		1			
....										1	1	1						
....					2			1	1		2	1	1		3	1	1	2
....														1				
....				1						1					2			
....			1	2	18	30	4	2	2	31	16	42	31	21	16	17	9	38
5	2	1	2	4	84	35	15	9	4	64	41	45	72	30	46	24	18	44
....		1	.	1	28	3	4			8		6	6	4	5	1	1	7
....													2	1				
....					3					1	1	2	5	1	2			2
....						1												
....					1	3	1			3	3				1	2	1	
....					1	2		2	1	1	2	2	3	2	2		1	
....					1					1		1		2	1	1		
....	1									2				1	1			
....					2					1	1	1						
3	1		1	1	12	5	4	3	1	9	6	6	8	3	10	2	4	17
....					1					1	1			1			1	1
....					3	5			1	5	4		7		2	1	1	2
....											1		1		3	1		1
....																		
....					2		1			1	1	1				1		
....					4					2			1		1			2
....												1	1					1
....					2		1	1		4	3	3	1	1	4	2		3
2			1	2	24	16	4	3	1	25	18	22	37	14	14	13	9	8
4	...	1	1	4	43	32	7	4	2	66	40	53	61	30	51	33	28	41
....					3	4		1	1	11	2	3	2	2	2	3	5	7
....											1			1	1	2		
1											1							
....					1		1			2		1	1				1	
....			1	1	7	2	3			5	5	3	4		4	1	2	2

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*)										
Horseheads	5,000	1	....	0	0	0	...	...	...	...
HORNELLSVILLE	12,000	24	....	7	1	3	...	...	...	...
Bath	5,000	3	....	1	0	0	...	...	...	...
CORNING	11,061	15	....	5	0	2	...	1	...	...
Wellsville	5,000	5	....	0	1	1	...	...	...	...
OLEAN	9,462	8	....	2	0	1	...	...	...	...
Salamanca	4,251	6	....	1	0	0	...	...	...	...
DUNKIRK	15,000	22	....	10	2	3	...	...	...	...
JAMESTOWN	22,892	21	11.0	2	1	2	...	...	...	...
Westfield	2,430	3	....	1	1	0	...	...	...	...
Fredonia	4,125	6	....	0	0	2	...	...	...	...
Rest of District	248,600	293	14.0	39	8	103	1	4	...	...
EAST CENTRAL DISTRICT Totals	404,500	532	15.5	85	35	133	4	6	...	...
SYRACUSE	110,000	148	15.8	35	10	20	1	4	...	...
Baldwinsville	3,000	5	....	0	1	2	...	...	...	...
DeWitt	5,435	13	....	3	0	4	1	...	...	...
CORTLAND	9,014	17	....	6	2	3	...	...	...	...
Homer	2,381	5	....	0	0	1	...	...	...	...
ONEIDA	7,942	17	....	2	1	5	...	1	...	...
Hamilton	3,744	6	....	1	0	4	...	...	...	...
Cazenovia	3,830	4	....	1	0	1	1	...	...	...
Canastota	3,300	1	....	1	0	0	...	...	...	...
Norwich	5,766	11	....	4	0	2	...	...	...	...
Oneonta	7,147	11	....	1	2	1	...	...	...	...
Worcester	2,409	5	....	1	1	1	...	...	...	...
Cooperstown	2,368	2	....	0	0	1	...	...	...	...
Walton	4,869	4	....	1	0	3	...	...	...	...
Dehi	3,243	1	....	0	0	1	...	...	...	...
Liberty	4,568	22	....	0	2	2	...	...	...	...
Rest of District	225,540	260	18.5	29	16	82	1	1	...	...
WEST CENTRAL DISTRICT Totals	320,600	329	12.0	49	15	108	...	7	1	...
AUBURN	35,000	33	12.2	8	1	4	...	1	...	...
ITHACA	13,136	16	....	5	0	5	...	...	...	...
Hector	4,137	2	....	0	0	0	...	...	...	...
Waterloo	4,256	8	....	1	0	2	...	...	...	...
Seneca Falls	6,519	6	....	1	0	1	...	...	...	...
GENEVA	10,433	21	....	5	3	3	...	1	...	...
Canandaigua	6,151	8	....	2	0	3	...	...	...	...
Manchester	4,733	7	....	0	0	3	...	...	...	...
Phelps	4,788	2	....	1	0	0	...	...	...	...
Penn Yan	4,650	7	....	1	0	2	...	...	...	...
Batavia	9,180	15	....	4	2	5	...	...	...	...
Dansville	3,633	4	....	0	0	2	...	1	...	...
Le Roy	3,144	4	....	0	0	2	...	...	...	...
Warsaw	4,341	3	....	0	0	2	...	...	...	...
Rest of District	206,500	193	12.0	21	9	74	...	4	1	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	915,200	1,133	15.0	319	73	208	5	12	2	...
BUFFALO	380,000	487	15.3	174	45	51	2	4	...	...
TONAWANDA	7,421	6	....	1	1	1	...	...	...	...
Amherst	4,223	4	....	0	0	1	...	...	...	...
NORTH TONAWANDA	9,069	10	....	7	1	1	...	...	...	...
LOCKPORT	16,581	25	....	4	1	6	...	...	...	...

FOR AUGUST—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
													1					
1				1	5	1		1		4	2	1	4	2	1		1	
										1			1					1
					4					1	3	2			3			1
					1			1			1			1		1		
					1					1	1	1	1		2			1
						1								1	2			2
2					7	1			1	2	1		2	1	2			3
						5				1	3	2	2	4	2			2
					1										2			
												1	2	1			2	
		1		2	13	18	3	1		38	20	39	41	17	30	26	17	22
1	1	1	3	11	47	54	15	8	1	53	36	50	69	35	30	42	24	41
1	1	1	1	1	22	15	5	3		22	8	9	13	8	7	8	4	14
						1					1	1				1	1	
						2	1			2	1	1	1		3			1
				1	3		2			1	3		2				1	4
						1				1		1			1		1	
					3	2	1			2			1		3	1	3	
					1					1	1	1	1		1			
												1	2					
					1													
					2	1				1			2	2			1	2
					2					1	1	2	1	1			1	2
			1							2				1				1
														1		1		
					1										2	1		
													1					
						16							4		1		1	
			1	9	12	16	6	5	1	20	21	34	41	22	12	30	11	17
	1	2	1	2	34	23	5	5	3	31	15	51	46	19	26	23	10	24
					7	2				3	2	3	4	2	4	2	2	1
					3				1		2	3	3		2			2
									1						1			
					1	1				1		1	2	1	1			
						2				1	1		1					1
				1	5	1				2	1	1	1	1	2		1	4
					2					2			2			1		1
											2	1	2			1	1	
					1						1							
				1						1		1			1	1	1	1
					3	1				1		3	1	1		1		4
													1			1		1
										1		3						
						1				1						1		
	1	2	1		12	15	5	5	1	18	6	35	29	14	15	15	5	9
1	2		5	18	232	89	14	21	9	111	49	108	130	63	84	48	45	85
	2		2	9	140	40	9	17	5	37	19	42	42	19	31	4	21	42
					2					1			1	2				
						1					1		1		1			
			1		2	1				1	1		1	2			1	
				1	2	3	1	1		2	2	4	3	1		2	2	1

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*)										
NIAGARA FALLS	25,000	48	22.5	20	2	3	1	1	...	...
Medina	4,716	2	....	0	1	0	...	...	...	...
Albion	4,477	6	....	1	0	3	...	...	...	...
Brockport	3,400	6	....	1	0	2	...	...	...	...
ROCHESTER	165,000	193	14.0	42	5	35	1	...	1	...
Palmyra	3,758	8	....	1	0	1	...	...	...	...
Newark	4,578	4	....	0	0	2	...	...	...	...
Lyons	5,824	8	....	0	0	5	...	...	...	...
Clyde	2,507	2	....	0	0	1	...	...	...	...
OSWEGO	22,200	27	14.3	4	2	7	...	3	...	...
FULTON	8,734	7	....	1	1	2	...	...	...	...
Richland	3,535	3	....	0	0	2	...	...	...	...
Rest of District	244,184	287	14.0	63	14	85	1	4	1	...
Totals for the State	7,746,000	11,116	17.0	2,974	1,139	1,567	119	143	16	2
Average for past five years	....	10,627	17.3	*3,987	......	1,468	48	161	25	10

* All deaths under 5 years of age.

REMARKS.—The highest range of the barometer was on the 9th and lowest on the 20th of the month. There were 13 days on which precipitation occurred and 10 on which it amounted to .01 of an inch. Except on the coast there was little variation from the normal rainfall, some parts of the State showing deficiency. The average of highest rainfall in the records of thirty years is 8½ inches, and of lowest one half inch, during this month. The mean temperature of the month was everywhere subnormal, the first and third weeks having highest temperatures of 80 degrees to 89 degrees, the last week cold with lowest temperatures below 50 degrees. The mean temperature for the month was higher than that of August of last year, and 3 degrees lower than that of July.

AUGUST HEALTH CONDITIONS.—The number of deaths this month is about 1,000 less than were reported in July, and the death rate has fallen from 18.5 to 17.0. This is customary; the average of past years shows that about 800 fewer deaths occur in August than in July, the latter having a pretty uniform mortality of 11,500 and the former of 10,700, which is exceeded this month by about 400, while the July mortality was also excessive to a like degree.

The decrease from last month is in the urban mortality. In five large cities of over 100,000 population there were this month 7,000 deaths against 8,100 in July, and the city of New York reports 1,000 fewer deaths than in July. The urban rate of mortality, including all cities above 20,000 population, was 20.7 last month against 17.5 this month. The rural death rate, including the rest of the State, was on the other hand 14.0 last month against 15.0 this. In rural towns (noted as "Rest of District" in the Bulletin) there were 1,900 deaths in July and 2,100 in August.

THE INFANT MORTALITY shows a more marked decrease, there being nearly 600 fewer deaths under one year of age and 1,800 fewer between one and five years of age. In July, 53.0 per cent. of the decedents were under five years of age, a rate of childhood mortality seldom reached; this month it is 37.0 per cent. In five large cities there were this month but 3,000 deaths under five years of age against 5,400 in July, and in the cities of over 20,000 population the death rate per thousand population of decedents under five years of age is 7.6 against 13.3 in July. In rural towns however, this month's death rate at this age is 3.0 per thousand population against 2.0 in July.

The DIARRHEAL MORTALITY this month is 500 less than in July. The record this year is of deaths from this cause occuring under five years of age, but the number this month is about the average for the past five years of acute diarrheal mortality at all ages, and 150 less than for the past twenty years, and the same is true of the month of July. In July 20.5 per cent. of the mortality was diarrheal, and in the last twenty years 23.5 per cent.; in August, 18.0 per cent. and 20.0 per cent., respectively. Outside of New York city there were 165 deaths reported from acute diarrheal diseases occurring above the age of five years, and 100 in July. This would indicate that diarrheal deaths this year have been below the average of past years.

for August—(*Concluded*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	1	...	13	3	3	......	1	3	1	.....	6	2	8	...	2	3
....	...	...	...	1	......	......	......	......	...	......	......	.....	......	...	1	...	.....	......
....	...	...	...	...	......	......	......	......	...	......	......	1	......	...	...	2	.....	3
....	...	...	...	...	......	......	......	......	...	1	......	.....	3	1	...	...	.....	1
....	...	...	1	3	25	17	.....	2	2	28	9	14	30	17	10	12	7	14
....	...	...	...	...	1	1	.....	......	1	.....	3	.....	2	...	...	...	.....	......
....	...	...	...	...	......	1	.....	......	...	......	......	1	......	...	...	1	.....	1
....	...	...	...	...	......	1	.....	......	...	1	.....	1	1	1	2	1	.....	......
....	...	...	...	...	......	1	.....	......	...	1	.....	.....	......	...	...	...	.....	......
....	...	...	...	...	5	.....	1	......	...	4	1	2	4	2	...	3	2	......
....	...	...	...	1	2	1	.....	......	...	1	1	1	......	...	...	...	.....	......
....	...	...	...	...	......	......	.....	......	...	1	.....	1	1	...	...	...	.....	......
1	...	...	...	3	40	19	.....	1	...	30	11	41	35	16	31	23	10	20
27	34	18	40	171	2,011	1,075	286	344	78	732	759	963	942	513	738	306	493	1,326
37	43	14	96	166	1,983	1,034	.....	†578	80	875	685	839	980	430	690	373	.....	‡1,480

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

The deaths reported from acute diarrheal diseases *above the age of five years* were at least 80 per cent. of them at an age past 60 years, the average age being 68. It is a common cause of death at old age. Relatively they constituted about the same mortality both in cities and rural towns, 4 deaths per 100,000 population. Of 150 deaths, 60 were reported as from dysentery, 60 from enteritis and cholera morbus, and 30 from simple diarrhea. From dysentery no more than one or two deaths in a single locality are reported save the Long Island State Hospital which reports 12 deaths from acute catarrhal or diphtheritic dysentery. In many cases no doubt the term is used indifferently with simple inflammatory diarrhea. Dysentery is given as the cause of death in 15 out of 500 deaths under five years of age. More than half of these 500 deaths were given as from cholera infantum. This term is likewise without doubt loosely used, but is a chosen name of the medical profession for infantile deaths from diarrheal disease. Inflammatory diarrhea, that is, gastro-enteritis, entero-colitis and the like, caused a large part of the remainder of these deaths under five years, 50 being returned from diarrhea without definition. More than four fifths of the deaths occurred under the age of one year, only 75 of the 500 being between 1 and 5 years. The duration of sickness was given as from one to 21 days and without distinction as between these from cholera infantum and from entero-colitis, the latter averaging a little longer in the entire number reported. Those given as from dysentery were from three to seven days duration. Of attendant conditions, meningitis is reported in 25 cases as secondary, and in many cases dentition, indigestion and improper food is given as a cause or complication. Marasmus and malnutrition is a commonly reported attendant on cases of longer duration.

July is the month of highest diarrheal mortality, only in the large cities. The rural rate is highest in August. In the maritime district 27.0 per cent. of the deaths in July were from diarrheal diseases, while for the rest of the State it was 8.0 per cent., and in rural districts 3.0 to 4.0 per cent. In August the maritime percentage has fallen to 20.0, and all the other districts have increased, with an average of 12.0. In rural towns the August diarrheal mortality is double that of July. This relative incidence of diarrheal mortality, as of infantile, will as heretofore doubtless continue in September.

Health officers are notified that diphtheria antitoxin may be kept in stock for one year without material loss of its specific strength, providing it is stored in a cool (40 to 60 deg. F.) dark place. Laboratory tests of antitoxin returned a year or more after its distribution have fully confirmed this statement. Any slight loss of strength which may occur is provided for in the preparation of the serum for distribution.

At the end of one year application should be made for a fresh supply and upon receipt of the same the old stock should be returned by mail or express prepaid to the Antitoxin Laboratory, Lake avenue, Albany, N. Y.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Sept

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT										
Totals	4,158,600	5,864	17.0	1,617	587	503	66	93	11	...
CITY OF NEW YORK										
Totals	3,838,024	5,383	17.0	1,509	551	410	64	82	9	...
BOROUGH OF MANHATTAN	1,940,121	2,888	17.6	846	290	184	46	31	2	...
BOROUGH OF THE BRONX	294,939	405	16.7	91	29	38	4	5	1	...
BOROUGH OF BROOKLYN	1,334,952	1,754	16.0	472	204	161	14	37	5	...
BOROUGH OF QUEENS	193,494	238	15.0	77	22	17	...	7	1	...
BOROUGH OF RICHMOND	74,158	98	16.0	23	6	10	...	2	...	...
Oyster Bay	16,334	10	....	1	1	1	...	...	...	...
Hempstead	27,066	49	21.5	9	3	15	...	...	1	...
North Hempstead	12,048	24	....	9	4	1	...	1	...	...
Southold	8,301	7	....	1	1	3	...	1	...	...
Sag Harbor	3,500	2	....	0	1	0	...	...	...	...
Huntington	9,483	5	....	1	0	1	...	1	...	...
Brookhaven	14,592	22	....	0	1	14	...	2	...	...
YONKERS	50,000	71	....	21	9	13	1	1	...	...
Greenburg	15,564	21	....	5	2	1	...	...	...	...
MOUNT VERNON	20,346	24	14.5	5	2	3	...	...	...	...
Port Chester	7,440	18	....	5	0	2	...	4	...	...
Ossining	7,939	7	....	0	0	5	...	...	...	...
NEW ROCHELLE	14,720	19	....	7	1	2	...	...	...	...
Peekskill	10,358	15	....	9	2	3	...	...	1	...
White Plains	7,900	19	....	9	1	5	...	...	...	...
Rest of District	95,000	168	21.5	26	8	34	1	1	...	...
HUDSON VALLEY DISTRICT										
Totals	696,000	871	15.5	151	52	195	5	15	3	...
ALBANY	100,000	123	15.0	18	2	17	...	3	1	...
COHOES	24,000	24	12.0	10	0	1	...	...	...	...
TROY	75,057	115	18.6	20	5	21	2	3	...	...
WATERLVIET	14,321	17	....	4	0	3	...	...	...	...
Green Island	4,770	4	....	1	1	0	...	...	...	...
Hoosick Falls	5,671	......	....	......	......	......	...	...	...	...
RENSSELAER	*10,000	9	....	2	0	2	...	...	...	...
Coxsackie	4,102	3	....	1	1	0	...	...	...	...
Catskill	5,486	4	....	1	1	0	...	...	...	...
HUDSON	9,528	10	....	3	0	3	...	...	...	...
KINGSTON	24,535	39	18.7	4	5	4	...	1	1	...
Ellenville	3,000	5	....	0	1	1	...	...	...	...
Marbletown	3,511	2	....	0	0	2	...	...	...	...
Rosendale	6,278	5	....	1	1	0	1	...	...	...
Esopus	4,907	5	....	1	0	0	...	...	...	...
Saugerties	3,700	4	....	0	2	0	...	...	...	...
POUGHKEEPSIE	24,029	23	....	3	0	8	...	...	...	...
Fishkill	13,016	19	....	5	0	1	1	...	...	...
Wappingers Falls	3,504	5	....	0	0	3	...	...	...	...
NEWBURG	25,000	28	13.7	7	2	5	...	1	...	...
Port Jervis	9,385	22	....	3	0	4	...	1	...	...
MIDDLETOWN	14,522	26	....	3	1	3	...	...	...	...
Warwick	6,403	3	....	0	0	1	...	...	...	...
Goshen	4,564	6	....	1	1	3	...	...	...	...

*The Population of Rensselaer was increased in 1903 by the addition of Bath-on-the-Hudson to 10,000.

DEPARTMENT OF HEALTH—VOLUME XX.

***districts, cities, villages and towns in the State of New York ember,* 1904.**

Roman type. Population estimated to date printed in full face figures.]

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
9	21	15	21	117	835	627	446	114	43	307	474	426	427	271	383	74	248	836
9	21	13	20	110	778	590	432	107	40	247	443	368	378	257	350	48	224	793
4	9	9	8	58	434	283	255	59	17	122	231	216	192	154	206	13	139	400
3	3	...	2	7	37	104	22	9	5	10	37	22	24	20	22	4	15	49
2	9	3	10	42	285	174	138	25	18	96	149	107	127	72	95	27	55	264
...	...	1	...	1	4	21	10	6	...	17	18	16	28	6	18	1	6	77
...	...	...	...	2	18	8	7	8	...	2	8	7	7	5	9	3	9	3
...	...	...	...	...	...	1	...	...	...	2	...	1	1	1	2	...	1	1
...	...	...	...	1	5	3	...	...	...	6	3	6	4	3	1	6	6	4
...	...	...	...	...	6	1	...	...	...	3	...	2	...	...	3	1	3	4
...	...	...	...	...	2	...	...	...	...	1	...	1	1	...	...	1	...	...
...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	1	...	...	1
...	...	...	...	...	1	...	1	...	...	...	1	5	5	...	1	6	...	...
...	...	...	...	2	15	9	2	5	1	8	7	6	1	2	4	4	1	2
...	...	...	...	1	3	1	...	1	...	1	5	2	...	...	2	...	2	3
...	...	...	...	...	1	1	1	...	1	3	2	2	2	...	2	1	3	5
...	...	...	...	...	1	...	...	...	...	3	2	1	1	...	1	1	...	4
...	...	...	...	...	...	...	1	...	...	...	3	2	...	1	...	...	...	...
...	...	1	...	1	4	1	...	...	...	1	...	2	2	...	3	...	...	4
...	...	...	...	...	3	...	...	1	...	2	...	...	...	1	...	2	2	3
...	...	...	...	1	2	...	3	...	...	1	3	4	4	...	...	...	...	1
...	...	1	1	1	13	19	6	...	1	29	5	23	27	6	13	4	6	11
1	...	...	2	7	75	104	22	10	4	93	76	106	115	36	54	40	36	67
...	...	...	...	...	6	12	5	4	1	11	20	16	13	7	7	1	8	8
...	...	...	...	...	2	4	2	...	...	1	...	1	4	1	3	1	...	5
...	...	...	1	2	7	14	3	1	1	11	8	22	16	7	3	2	4	8
...	...	...	...	...	2	5	...	...	...	1	...	1	4	...	...	...	1	3
...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	1	...	...	1
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	1	...	...	...	...	1	...	1	...	...	1	2	2	1
...	...	...	...	...	2	...	...	...	...	...	...	1	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	2
...	...	...	...	...	...	...	...	...	...	3	...	...	...	3	1	1	...	2
...	...	...	...	...	3	5	...	...	1	5	4	4	3	1	2	...	3	6
...	...	...	...	...	1	1	...	...	...	...	...	...	2	...	...	...	1	...
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...
...	...	...	...	...	...	2	...	...	...	1	...	...	1	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	2	...	...	1
...	...	...	...	...	...	1	...	...	...	2	1	...	...	...	...	...	...	...
...	...	...	...	...	1	6	...	...	...	2	...	3	4	1	2	2	...	2
...	...	...	...	...	2	2	...	...	...	1	2	2	4	...	2	1	1	1
...	...	...	...	...	...	1	1	...	...	1	...	...	1	...	1	...	...	...
...	...	...	...	1	4	6	...	...	...	1	5	...	2	1	1	2	1	3
...	...	...	...	1	2	1	...	1	...	4	...	1	4	...	6	...	...	1
...	...	...	...	...	1	3	...	...	...	...	3	5	3	2	4	1	2	2
...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	...	1	...	...
...	...	...	...	...	2	...	...	...	...	...	...	1	1	...	...	1	1	...

MONTHLY BULLETIN

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT—(*Con.*)										
Montgomery	5,939	11	....	3	0	2	...	1	...	...
Haverstraw	9,874	11	....	3	1	2	...	...	...	...
Nyack	4,275	10	....	3	0	4	...	...	...	...
Ramapo	7,502	18	....	4	1	4	...	...	...	...
Rest of District	271,800	320	15.0	50	17	101	1	5	1	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	483	14.5	80	28	155	1	8	...	...
WATERTOWN	21,700	22	12.5	8	2	4	...	...	...	...
Ellisburg	3,888	4	....	0	0	2	...	...	...	...
Cape Vincent	2,882	2	....	0	0	1	...	...	...	...
Clayton	4,313	8	....	1	2	2	...	...	...	...
OGDENSBURG	12,633	19	....	7	0	6	...	...	...	...
Gouverneur	6,000	4	....	0	0	1	...	...	...	...
Potsdam	3,843	4	....	0	0	2	...	...	...	...
Canton	6,387	9	....	1	1	3	...	...	...	...
Malone	5,935	7	....	1	0	0	...	...	...	...
PLATTSBURG	8,434	19	....	7	2	4	...	...	...	...
Glens Falls	12,613	21	....	2	2	6	...	1	...	...
Whitehall	4,377	4	....	1	1	1	...	...	...	...
Fort Edward	5,216	6	....	2	1	1	...	...	...	...
Sandy Hill	4,473	2	....	0	0	0	...	...	...	...
Granville	5,217	3	....	0	0	1	...	...	...	...
Greenwich	4,172	7	....	1	0	2	...	...	...	...
Lowville	3,746	4	....	2	0	0	...	...	...	...
Rest of District	279,000	338	15.0	47	17	119	1	7	...	...
MOHAWK VALLEY DISTRICT Totals	428,400	549	16.0	94	39	148	1	10	...	...
SCHENECTADY	56,000	69	15.0	26	5	8	...	2	...	...
Cobleskill	3,973	4	....	0	0	3	...	...	...	...
AMSTERDAM	20,929	11	....	4	0	0	...	...	...	...
Fort Plain	2,444	5	....	0	0	3	...	...	...	...
JOHNSTOWN	10,130	9	....	2	0	1	...	...	...	...
GLOVERSVILLE	18,349	23	....	3	1	5	...	...	...	...
LITTLE FALLS	10,381	12	....	3	0	1	...	2	...	...
Herkimer	5,555	6	....	0	2	1	...	...	...	...
Ilion	5,138	3	....	1	0	0	...	...	...	...
UTICA	56,383	103	21.5	23	13	20	...	...	...	...
Whitestown	6,235	11	....	3	0	6	...	...	...	...
ROME	15,343	24	....	4	2	8	...	...	...	...
Boonville	3,332	2	....	1	0	0	...	...	...	...
Camden	3,745	4	....	1	0	1	...	...	...	...
Waterford	6,157	11	....	0	0	6	...	...	...	...
Mechanicville	4,695	8	....	4	0	0	...	1	...	...
Ballston Spa	3,923	7	....	1	0	2	...	1	...	...
Saratoga Springs	12,409	25	....	7	1	5	...	...	...	...
Rest of District	183,250	212	13.5	11	15	78	1	4	...	...
SOUTHERN TIER DISTRICT Totals	433,000	531	15.0	68	41	142	2	9	1	...
BINGHAMTON	40,000	58	17.6	7	1	12	...	...	1	...
Owego	5,039	8	....	1	0	4	...	...	...	...
Candor	3,330	4	....	0	0	2	...	...	...	...
Waverly	4,500	5	....	1	0	1	...	1	...	...
ELMIRA	35,672	34	12.0	6	3	6	1	1	...	...

FOR SEPTEMBER—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	...	...	2	.....	.....	....	...	1	2	.....	3	...	...	1	.....	1
....	...	...	...	...	2	.....	.....	....	...	1	2	1	1	1	1	1	.....	1
....	...	...	...	...	.....	.....	.....	....	...	1	.....	.....	2	1	2	1	1	2
....	...	...	...	...	3	1	.....	....	...	2	1	4	1	...	2	1	1	2
1	...	...	1	3	32	40	10	4	1	41	26	40	45	11	13	20	10	15
3	...	1	...	6	33	38	15	10	2	41	32	72	64	28	24	39	21	45
....	...	...	...	2	3	2	.....	1	...	.....	.....	2	2	...	1	2	2	5
....	...	...	...	...	.....	.....	.....	....	...	1	.....	2	.....	...	...	...	1	......
....	...	...	...	...	.....	.....	.....	....	...	.....	.....	1	.....	...	...	1	.....	......
....	...	...	...	...	.....	.....	.....	1	...	.....	1	3	.....	1	...	1	1	......
....	...	...	...	...	3	3	.....	....	...	1	.....	3	2	2	1	...	2	2
....	...	...	...	...	.....	.....	.....	....	...	.....	.....	1	1	...	1	...	1	......
....	...	...	...	...	.....	1	.....	....	...	.....	.....	2	1	...	...	...	.....	......
....	...	...	...	...	2	.....	.....	....	...	1	.....	3	1	1	...	1	.....	......
....	...	...	...	...	.....	1	.....	....	...	.....	1	1	1	1	1	...	.....	1
....	...	...	...	...	4	1	.....	....	...	2	3	2	1	...	...	2	2	2
....	...	...	...	...	1	2	.....	1	...	3	2	2	4	...	...	3	1	1
....	...	...	...	...	.....	.....	.....	2	...	1	1	.....	.....	...	...	...	.....	......
....	...	...	...	...	1	1	.....	....	...	.....	.....	2	.....	...	...	...	.....	2
....	...	...	...	...	.....	.....	.....	....	...	.....	.....	.....	.....	2	...	...	.....	......
....	...	...	...	...	.....	.....	.....	....	...	1	1	.....	.....	...	1	...	.....	......
....	...	...	...	...	1	1	.....	....	...	.....	1	2	2	...	...	...	.....	......
....	...	...	...	...	1	.....	.....	1	...	1	.....	1	.....	...	...	...	.....	......
3	...	1	...	4	17	26	15	4	2	30	22	45	49	21	19	29	11	32
9	...	...	3	8	52	49	19	10	1	54	28	54	68	22	44	30	20	67
....	...	...	...	1	14	4	1	1	...	7	2	7	7	...	7	1	2	13
....	...	...	...	...	.....	.....	.....	....	...	1	1	.....	.....	1	...	1	.....	......
....	...	...	...	...	1	3	.....	....	...	1	.....	.....	.....	1	2	...	.....	3
....	...	...	...	...	.....	.....	.....	....	...	1	.....	.....	1	1	2	...	.....	......
....	...	...	...	...	1	.....	.....	....	...	.....	1	1	1	...	1	1	.....	3
....	...	...	...	1	2	2	.....	1	...	2	2	4	3	1	1	2	.....	2
....	...	...	...	...	1	3	.....	....	...	1	.....	.....	.....	...	3	1	.....	1
....	...	...	...	...	1	.....	.....	....	...	3	.....	.....	.....	1	1	...	.....	......
....	...	...	...	...	1	.....	1	....	...	.....	.....	.....	1	...	...	...	.....	......
8	...	...	2	1	5	9	10	5	...	9	3	9	11	5	7	2	6	11
....	...	...	...	...	2	1	.....	....	...	.....	.....	5	.....	...	1	1	.....	1
....	...	...	...	1	3	2	1	....	...	1	1	1	8	...	...	3	1	2
....	...	...	...	...	.....	.....	.....	....	...	.....	.....	.....	.....	1	...	...	.....	1
....	...	...	...	...	.....	1	.....	....	1	.....	.....	.....	1	...	...	...	.....	1
....	...	...	...	...	.....	2	1	....	...	1	.....	2	1	1	...	2	.....	1
....	...	...	...	1	1	1	.....	....	...	.....	.....	.....	1	...	...	...	.....	3
....	...	...	...	...	1	.....	.....	....	...	.....	.....	1	2	...	2	...	.....	......
....	...	...	...	...	3	4	1	....	...	3	1	2	2	2	...	1	2	4
1	...	...	1	3	16	17	4	3	...	24	17	22	29	8	17	15	9	21
....	1	1	...	11	39	29	11	8	4	57	20	81	64	34	48	32	22	57
....	...	...	...	1	.....	6	1	1	...	2	2	11	7	8	3	3	3	9
....	...	...	...	...	1	1	.....	....	...	4	.....	.....	2	...	...	...	.....	......
....	...	...	...	...	.....	.....	.....	....	...	1	.....	.....	2	...	1	...	.....	......
....	...	...	...	...	.....	.....	.....	....	...	.....	.....	.....	.....	...	...	1	1	2
....	...	...	...	2	6	1	.....	1	...	2	7	6	2	1	1	1	1	1

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*)										
Horseheads	5,000	3	....	0	0	1	...	1	...	...
HORNELLSVILLE	12,000	17	....	2	1	1	...	...	...	...
Bath	5,000	2	....	0	0	2	...	...	...	...
CORNING	11,061	13	....	1	2	2	...	...	...	...
Wellsville	5,000	9	....	0	0	1	...	...	...	...
OLEAN	9,462	18	....	3	1	3	...	...	...	...
Salamanca	4,251	6	....	1	0	3	...	...	...	...
DUNKIRK	15,000	20	13.5	7	1	2	...	...	...	...
JAMESTOWN	22,892	29	15.3	3	2	7	...	2	...	...
Westfield	2,430	.....	....	.....	.....	.....	...	...	...	...
Fredonia	4,125	7	....	1	0	4	...	...	...	...
Rest of District	248,600	298	15.0	35	20	91	1	4	...	...
EAST CENTRAL DISTRICT Totals	404,500	474	14.2	75	29	116	2	11	...	...
SYRACUSE	110,000	132	14.6	30	10	16	1	5	...	...
Baldwinsville	3,000	1	....	0	1	0	...	...	...	...
DeWitt	5,435	7	....	0	1	1	...	...	...	...
CORTLAND	9,014	12	....	2	0	4	...	...	...	...
Homer	2,381	.....	....	.....	.....	.....	...	...	...	...
ONEIDA	7,942	7	....	3	0	2	...	1	...	...
Hamilton	3,744	7	....	2	0	2	...	...	...	...
Cazenovia	3,830	3	....	0	0	2	...	...	...	...
Canastota	3,300	8	....	1	1	0	1	...	...	...
Norwich	5,766	6	....	2	1	2	...	...	...	...
Oneonta	7,147	11	....	1	1	1	...	2	...	...
Worcester	2,409	5	....	1	0	3	...	...	...	...
Cooperstown	2,368	2	....	1	0	0	...	...	...	...
Walton	4,869	1	....	0	0	1	...	...	...	...
Delhi	3,243	2	....	1	0	0	...	...	...	...
Liberty	4,568	22	....	6	1	1	...	...	...	...
Rest of District	225,540	248	13.5	25	13	81	...	3	...	...
WEST CENTRAL DISTRICT Totals	320,600	385	14.5	55	27	133	3	5	1	...
AUBURN	35,000	29	10.0	6	4	2	1	1	...	...
ITHACA	13,136	14	....	5	0	1	...	1	...	...
Hector	4,137	6	....	0	1	3	...	...	...	...
Waterloo	4,256	5	....	0	0	3	...	...	...	...
Seneca Falls	6,519	4	....	1	0	0	...	1	...	...
GENEVA	10,433	8	....	0	2	2	...	...	...	...
Canandaigua	6,151	9	....	1	1	1	...	...	...	...
Manchester	4,733	8	....	1	0	2	...	...	...	...
Phelps	4,788	5	....	1	0	3	...	...	...	...
Penn Yan	4,650	7	....	1	0	1	...	...	...	...
Batavia	9,180	5	....	1	0	2	...	...	...	...
Dansville	3,633	7	....	0	1	4	...	...	...	...
Le Roy	3,144	3	....	1	0	1	...	...	...	...
Warsaw	4,341	11	....	2	0	2	...	...	...	...
Rest of District	206,500	264	13.0	35	18	106	2	2	1	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	915,200	1,136	15.0	258	88	233	5	28	1	...
BUFFALO	380,000	503	16.0	125	44	64	1	15	1	...
TONAWANDA	7,421	1	....	0	1	0	...	...	...	...
Amherst	4,223	2	....	0	0	1	...	...	...	...
NORTH TONAWANDA	9,069	4	....	3	0	0	...	...	...	...
LOCKPORT	16,581	16	....	1	0	3	...	1	...	...

FOR SEPTEMBER—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
										1				1				
				2	1	3	1			2	1	1	1		2			3
																2		
					2	1		1		1		1	2	1	1			3
						1	1				1	1		1			1	
					2	1	2		1	3		1	1	1	3	1		2
										1		2			2	1		
				1	4	1				4	1			1	3		2	3
					1	1				4	2	5	3	3	1	3		4
						1						2	2	1			1	
	1	1		5	22	12	6	5	3	32	6	51	42	16	31	20	13	30
5	...	...	1	4	38	35	10	5	1	46	36	65	60	27	30	32	19	47
1	...	...	...	2	9	9	3	3	...	11	10	18	14	7	9	4	7	19
							1											
							1					1	2		3			
					1	1				1	1	2	1	1	2	1		1
					1					1		2			1			1
					1						2	2						2
												2				1		
										1		1	1		2			2
					1					1			1			1		2
					2					2		1	1	2	1			
										1	1		1			1		1
					1								1					
												1						
					1								1					
			1		4	8				2			2	2			2	1
4				2	17	17	5	2	1	26	22	35	35	15	12	24	10	18
1	...	1	...	8	37	26	10	3	4	34	18	45	64	20	32	33	14	26
				2	4	5				1	1	3	3	1	3	1		2
					4						2	2	1	1	1			2
							1					1	1	1		1	1	
												3		1		1		
					1												2	
					1							1	2	1	2	1		
					2	2	1				1	1		1				1
					1					2			2	2			1	
		1			1								2	1				
						2						1			3			1
					1		1						1		1			1
					1	1					1	1	1	1		1		
												1	1					1
				1		1				3			4		1			1
1				5	21	15	7	3	4	28	13	31	46	10	21	28	10	16
5	2	2	4	17	158	83	27	23	11	107	64	122	137	55	68	64	41	112
	2	...	3	7	85	41	9	16	7	37	28	52	52	24	31	21	21	50
					1					1		1						
					1					2					1			
						2	1			1		3	2		1	3		2

MONTHLY BULLETIN

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC			
							Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Con.*)										
NIAGARA FALLS	25,000	33	16.2	12	4	2	1	2	...	...
Medina	4,716	3	....	0	0	1	...	...	...	...
Albion	4,477	9	....	4	0	4	...	...	...	...
Brockport	3,400	3	....	0	0	2	...	...	...	...
ROCHESTER	165,000	218	16.0	54	7	46	2	5	...	...
Palmyra	3,758	4	....	1	0	1	...	...	...	...
Newark	4,578	7	....	0	0	1	...	...	...	...
Lyons	5,824	8	....	0	0	3	...	1	...	...
Clyde	2,507	......	....	......	......	......	...	...	...	...
OSWEGO	22,200	24	....	3	4	5	...	1	...	...
FULTON	8,734	5	....	1	0	1	...	...	...	...
Richland	3,535	3	....	0	1	1	...	...	...	...
Rest of District	244,184	293	15.0	54	27	98	1	3	...	...
Totals for the State	7,746,000	10,292	16.1	2,398	891	1,625	85	179	17	...
Average for past five years	....	9,771	16.0	*3,310	......	1,431	36	202	29	3

* All deaths under 5 years of age.

REMARKS—While in many limited areas of the State there has been a deficiency of rainfall, and the stations of the Maritime district and at Buffalo report a precipitation for the month below the average, from most parts of the State the rainfall has been moderately excessive. There were fewer clear days than in August and than in September of last year which was a month of unusual clearness of atmosphere. Southerly winds uniformly prevailed with moderate movement, the average of highest velocity being 40 miles per hour from the northwest. The humidity of the atmosphere was excessive. The temperature was subnormal. Frosts occurred from the 23d to the 28th, the average of lowest temperatures being near the freezing point. The average mean temperature for the month was 7 degrees lower than in August, which was likewise subnormal, and 3 degrees lower than in September of last year.

TYPHOID FEVER reaches its height in September and October; for three years the autumnal increase has been lower than usual, but a number of local outbreaks have recently occurred. The following from a recently prepared circular on Prevention of Typhoid Fever is for the information of health boards:

CONDITIONS ON WHICH IT DEPENDS—Typhoid fever originates from a specific poison developed in a person sick with the disease. This poison is not given off as in scarlet fever or smallpox into the atmosphere about the sick person; it only leaves the body in the discharge from the bowels and kidneys. This fact simplifies the control of the disease. If everything soiled by these discharges is promptly disinfected, and if the discharges are either destroyed completely, or disinfected as far as possible and ultimately deposited where they can do no harm, there will be no possibility of typhoid fever being communicated to others.

Typhoid fever germs may live for a considerable time outside the body, varying under different conditions. In streams they will survive long enough to be carried a considerable distance; in surface soil they survive for months or probably from year to year, and may be under favorable weather conditions carried eventually to wells or streams, this being a chief cause for the autumnal prevalence of typhoid fever in the country. Wells become infected from leaking drains, vaults or cesspools, in which the discharges from typhoid fever patients have some time before been deposited, the contents of which thus infected readily reach this deeper excavation from varying distances according to the soil. They also become infected by the discharges from typhoid fever patients being thrown upon the surface or from the washing out of bed pans near the well. Streams used for water supply are infected in the same way by people living near them, by sewers discharging into them, or by vault contents being used for fertilizer on their watershed. Illustrations of these sources of infection are constantly occurring. In unsterilized stools of typhoid fever patients the disease germs have been found to live for several months, and mingled with dust may be carried by the wind into water supplies or into milk or food. These are some of the ways in which the infective matter of typhoid fever is preserved and becomes operative.

Typhoid fever is contracted by taking into the stomach any substance containing typhoid germs in living condition. The commonest way is by drinking water infected by careless disposal of the discharges from the sick. Uncooked food (the heat of cooking kills the germs) may be infected by being washed in infected water; ice from infected water or oysters fattened in infected streams may contain living germs; milk may be infected by being drawn or handled by those about the sick or by its receptacles being similarly exposed to infection; flies may carry the infection to food. Attendants may themselves

for September—(*Concluded*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
...	...	...	...	...	7	2	...	...	1	4	1	...	1	1	3	1	1	8
...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	2	...	...	...
...	...	...	...	...	3	...	...	...	...	1	...	...	1	...	...	2	1	1
...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	1	...	...
...	...	1	...	6	26	16	5	3	1	23	10	28	26	12	10	12	11	21
...	...	...	...	...	...	1	...	...	...	1	1	...	...	...	...	1	...	...
...	...	...	...	...	...	...	...	...	...	1	...	1	1	1	1	1	1	...
1	...	...	...	...	...	...	...	...	...	1	1	2	1	1	1	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	...	...	...	1	2	...	1	...	...	3	...	4	6	1	...	1	...	3
...	...	...	...	...	1	...	1	...	...	1	1	...	1	...	...	...	...	...
1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...
3	...	1	1	3	32	19	10	4	2	31	22	29	46	15	18	20	6	27
33	24	20	31	178	1,267	990	590	183	70	739	748	971	999	493	683	344	421	1,257
26	18	13	69	174	1,386	962	.....	†716	66	826	695	811	948	395	598	397	.....	‡1,399

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

contract the disease from hands soiled in waiting on the sick or by leaving the infection on objects such as door-knobs; or by preparing food before washing the hands may convey the disease to others, and in such ways epidemics are prolonged.

Suppression of Typhoid Fever—1. Communities in which typhoid fever prevails should first look after their drinking water. "The prevalence of typhoid fever is a measure of the purity of the water supply." Epidemics due to infected milk or other raw food are usually of short duration though they may be severe. No milkman in whose family exists a case of typhoid fever should be allowed to dispose of his milk to others unless every care is taken to keep it, the persons who handle it and the vessels containing it, entirely apart from possible contact with the sick or their surroundings.

2. A person sick with typhoid fever ought to be placed in a room apart from the common dwelling rooms, especially the kitchen. Preferably the care of the sick should be given by one person only. No one who has to do with the patient or who handles anything soiled by their discharges should touch any food or dishes used by others, certainly not without at least washing the hands with soap and water and changing the clothing. Similar care should be taken to avoid soiling door-knobs and the like whereby the hands of others may become infected. Their own protection requires that all persons who handle or have anything to do with the sick should wash their hands repeatedly, and that they should not partake of food in the sick-room; cleanliness in the room, as also of the sick person, utensils and bedding, with fresh air, will add to the welfare of themselves and the patient. Flies should be excluded.

3. The discharges from the sick person, care for which is of chief importance, must be received in a vessel containing half a pint or more of one of the disinfectant solutions (corrosive sublimate, 1-500, carbolic acid saturated, or chlorinated lime, 10 per cent.) and enough of the same added to cover them, with which they must be well mixed and remain for not less than an hour. Solid masses should be broken up with a stick which may be burned or a glass rod which may be disinfected. They can then be emptied into the water-closet where there are sewers, taking care not to soil the seats or covers. In the country it is best to deposit this material in a trench, which must be remote from a well or watercourse, four feet deep and two feet wide, each deposit being covered with quicklime and earth well beaten down, the trench being covered over with earth when thus half filled. Never throw the discharges on the surface. Rinse bed pans with disinfectant solution at the trench, never near the well. Clothing and bed linen soiled with discharges put into a disinfectant solution and eventually boil half an hour. Boil all dishes after use by the patient for 15 minutes, and burn food left by him. Room, bedding and clothing should be thoroughly disinfected at the termination of the disease. *The urine of typhoid fever patients contains the disease germs for several weeks after recovery and should be disposed of with care as indicated so long as this continues.* All cases of doubtful diagnosis should be referred to the laboratory of the local or State Department of Health.

The Mortality of September is 500 above the average, chiefly from acute diarrheal diseases, the deaths under five years from which exceed those from all ages a year ago; 110 deaths over this age, mostly at advanced age, occurred in 4,000 deaths (275 probably in this State), 60 of which were from dysentery. Diarrheal deaths decreased in the Maritime district from 2,000 in July to 800; in the rest of the State there were as many diarrheal deaths in September as in July. Consumption caused 150 and pneumonia 300 more deaths than in August; the total mortality is 850 less than last month.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Oct

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Epidemic: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT Totals	4,158,600	5,610	16.0	1,189	532	598	52	103	9	1
CITY OF NEW YORK Totals	3,838,024	5,146	15.8	1,102	508	498	52	91	7	1
BOROUGH OF MANHATTAN	1,940,121	2,817	16.5	654	262	239	39	36	3	...
BOROUGH OF THE BRONX	294,939	388	15.5	75	36	37	2	3	...	...
BOROUGH OF BROOKLYN	1,334,952	1,639	14.5	311	186	185	9	43	4	1
BOROUGH OF QUEENS	193,494	191	12.0	43	15	17	...	6	...	...
BOROUGH OF RICHMOND	74,158	111	17.8	19	9	20	2	3	...	...
Oyster Bay	16,334	30	....	8	0	11	...	...	...	...
Hempstead	27,066	32	15.0	11	2	6	...	1	1	...
North Hempstead	12,048	15	....	2	2	1	...	2	...	...
Southold	8,301	7	....	1	0	4	...	...	...	...
Sag Harbor	3,500	2	....	0	0	1	...	...	...	...
Huntington	9,483	7	....	2	1	2	...	...	...	...
Brookhaven	14,592	26	....	1	0	11	...	1	...	...
YONKERS	50,000	61	15.0	15	9	8	...	...	...	...
Greenburg	15,564	26	....	5	1	6	...	...	...	...
MOUNT VERNON	20,347	16	....	6	1	2	...	...	...	...
Port Chester	7,440	17	....	5	0	3	...	3	...	...
Ossining	7,939	4	....	0	0	1	...	...	...	...
NEW ROCHELLE	14,720	20	....	6	0	2	...	1	...	...
Peekskill	10,358	10	....	3	0	2	...	1	1	...
White Plains	7,900	12	....	1	1	2	...	...	...	...
Rest of District	95,000	179	22.0	21	7	38	...	3	...	...
HUDSON VALLEY DISTRICT Totals	696,000	878	15.0	127	42	200	8	11	2	...
ALBANY	100,000	136	16.0	18	5	22	2	...	...	...
COHOES	24,000	38	18.5	7	8	3	1	...	...	...
TROY	75,057	116	18.2	16	1	16	1	1	...	...
WATERVLIET	14,321	14	....	1	0	6	...	...	...	...
Green Island	4,770	7	....	2	0	0	...	...	...	...
Hoosick Falls	5,671	12	....	1	0	2	...	...	...	...
RENSSELAER	*10,000	9	....	1	0	1	...	...	...	...
Coxsackie	4,102	3	....	0	0	2	...	...	...	...
Catskill	5,486	3	....	0	0	2	...	...	...	...
HUDSON	9,528	11	....	1	0	4	...	1	...	...
KINGSTON	24,535	42	20.2	7	2	5	...	2	2	...
Ellenville	3,000	5	....	0	0	2	...	2	...	...
Marbletown	3,511	2	....	0	0	0	...	...	...	...
Rosendale	6,278	4	....	0	0	1	...	...	...	...
Esopus	4,907	3	....	1	1	0	...	...	...	...
Saugerties	3,700	8	....	2	1	2	...	...	...	...
POUGHKEEPSIE	24,029	28	14.0	3	2	10	...	...	...	...
Fishkill	13,016	17	....	2	1	5	...	1	...	...
Wappingers Falls	3,504	2	....	0	0	0	...	...	...	...
NEWBURG	25,000	47	22.0	8	4	11	...	...	...	...
Port Jervis	9,385	16	....	3	2	4	...	...	...	...
MIDDLETOWN	14,522	10	....	0	0	3	...	1	...	...
Warwick	6,403	7	....	2	0	1	...	...	...	...
Goshen	4,564	7	....	0	2	0	...	...	...	...

* The population of Rensselaer was increased in 1902 by the addition of Bath-on-the-Hudson to 10,000.

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York ober, 1904.

in Roman type. Population estimated to date printed in full face figures.]

Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
DISEASES.						OTHER CAUSES OF DEATH.												
33	24	7	15	128	410	691	611	135	48	260	503	510	426	245	355	100	247	697
30	23	6	12	119	378	654	582	115	46	226	463	460	372	220	326	74	236	653
11	3	5	5	53	230	324	347	58	19	120	246	277	217	131	168	24	147	354
6	6	...	...	6	14	96	35	14	4	7	36	21	31	14	37	5	11	40
9	14	1	6	53	115	211	176	30	20	85	155	135	107	63	96	35	70	201
....	...	...	1	5	16	16	13	10	2	9	13	27	6	6	16	3	6	36
4	...	...	...	2	3	7	11	3	1	5	13	.....	11	6	9	7	2	22
....	...	...	...	...	3	3	2	1	...	1	4	4	2	1	3	4	.....	2
....	...	...	...	3	4	3	2	1	...	2	1	1	2	...	...	3	2	6
....	...	...	...	...	.....	1	1	2	...	1	.....	.....	2	1	5	...	.....	.....
....	...	...	...	...	1	.....	1	.....	...	1	.....	1	1	...	...	1	.....	1
....	...	...	...	...	.....	.....	.....	.....	...	1	.....	.....	1	...	...	...	.....	.....
....	...	...	...	...	1	.....	.....	.....	...	.....	.....	3	.....	1	...	...	.....	2
....	...	...	...	1	.....	3	.....	.....	1	3	3	2	5	1	...	4	1	1
....	...	...	1	2	5	4	3	3	1	4	7	7	2	5	2	1	2	12
....	...	...	...	...	2	3	1	2	...	2	4	1	3	2	4	1	.....	1
....	...	...	...	...	2	.....	1	.....	...	.....	3	1	4	1	1	...	.....	3
....	...	...	...	...	3	.....	.....	2	...	.....	1	2	.....	2	...	1	2	1
....	...	...	...	...	.....	.....	.....	.....	...	.....	1	1	.....	...	2	...	.....	.....
....	...	...	...	1	2	1	1	1	...	3	1	1	1	1	2	...	.....	4
....	...	...	...	...	1	1	.....	.....	...	.....	1	1	1	...	1	1	.....	1
....	...	...	...	1	.....	.....	.....	2	...	1	.....	.....	2	3	1	1	.....	1
3	1	1	2	1	8	18	17	6	...	15	14	25	28	7	8	9	4	9
1	...	...	5	15	36	98	35	36	2	71	66	126	115	36	67	48	29	71
....	...	...	...	...	2	21	11	8	1	8	16	23	6	9	10	6	7	6
....	...	...	...	1	1	2	4	3	...	5	3	3	4	2	1	...	2	6
....	...	...	1	...	6	19	3	2	...	9	10	22	13	4	5	5	5	10
....	...	...	...	...	.....	1	.....	1	...	2	2	1	4	...	...	...	1	2
....	...	...	...	...	.....	.....	.....	.....	...	1	.....	2	.....	...	1	...	.....	3
....	...	...	...	...	.....	3	.....	1	...	2	2	1	1	1	...	...	.....	1
....	...	...	...	1	.....	1	1	.....	...	1	.....	.....	1	1	2	1	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	1	1	1	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	1	1	...	...	...	1	.....
....	...	...	...	...	1	1	.....	1	...	1	1	3	.....	1	1	...	.....	.....
....	...	...	1	...	2	4	.....	.....	1	.....	2	5	8	2	4	2	1	6
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	2	1	...	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	1	.....	.....	.....	...	1	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	1	.....	...	2	1	.....	.....
....	...	...	...	1	.....	.....	.....	.....	...	1	.....	.....	1	...	...	...	.....	.....
....	...	...	...	...	1	1	.....	1	...	1	1	.....	1	1	1	...	.....	.....
....	...	...	...	...	2	1	.....	3	...	3	2	7	4	1	...	3	1	1
....	...	...	...	1	.....	.....	.....	1	...	1	1	1	2	1	3	2	.....	3
....	...	...	...	...	.....	1	.....	.....	...	1	.....	.....	.....	...	...	...	.....	.....
....	...	...	...	3	2	6	3	.....	...	1	3	5	5	1	7	3	2	6
....	...	...	...	2	1	2	1	1	...	1	.....	1	.....	...	1	3	.....	3
....	...	...	...	...	.....	2	.....	.....	...	2	1	.....	1	1	1	1	.....	.....
....	...	...	...	1	.....	1	.....	.....	...	.....	.....	.....	2	1	1	...	1	.....
....	...	...	...	1	.....	1	.....	1	...	.....	.....	2	.....	1	1	...	.....	.....

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death-rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DIST.—(*Con.*)										
Montgomery	5,939	10	....	1	1	5	...	...	...	...
Haverstraw	9,874	6	....	2	0	0	...	...	...	...
Nyack	4,275	7	....	0	0	2	...	...	...	...
Ramapo	7,502	8	....	1	0	0	...	...	...	...
Rest of District	271,800	300	13.5	48	12	91	4	3	...	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	411	13.0	48	17	108	1	8	...	...
WATERTOWN	21,700	19	11.0	4	0	3	...	...	...	...
Ellisburg	3,888	5	....	0	0	4	...	...	...	...
Cape Vincent	2,882	3	....	0	0	1	...	...	...	...
Clayton	4,313	10	....	1	2	4	...	...	...	...
OGDENSBURG	12,633	9	....	1	0	3	...	...	...	...
Gouverneur	6,000	2	....	0	1	1	...	...	...	...
Potsdam	3,843	2	....	1	0	0	...	...	...	...
Canton	6,387	9	....	1	0	4	...	...	...	...
Malone	5,935	5	....	1	0	0	...	...	...	...
PLATTSBURG	8,434	14	....	1	0	4	...	...	...	...
Glens Falls	12,613	20	19.0	3	1	3	1	1	...	...
Whitehall	4,377	5	....	0	0	0	...	...	...	...
Fort Edward	5,216	6	....	1	0	1	...	...	...	...
Sandy Hill	4,473	2	....	0	0	0	...	...	...	...
Granville	5,217	9	....	1	1	1	...	1	...	...
Greenwich	4,172	4	....	1	0	1	...	...	...	...
Lowville	3,746	5	....	0	0	3	...	...	...	...
Rest of District	279,000	282	13.0	32	12	75	...	6	...	...
MOHAWK VALLEY DISTRICT Totals	428,400	537	14.5	83	28	133	5	18	...	...
SCHENECTADY	56,000	61	13.7	19	2	8	1	1	...	...
Cobleskill	3,973	6	....	2	0	2	...	...	...	...
AMSTERDAM	20,929	57	24.0	13	2	8	1	3	...	...
Fort Plain	2,444	4	....	0	0	1	...	...	...	...
JOHNSTOWN	10,130	3	....	1	0	1	...	...	...	...
GLOVERSVILLE	18,349	20	14.0	1	1	6	...	...	...	...
LITTLE FALLS	10,381	13	....	1	1	3	...	...	...	...
Herkimer	5,555	7	....	2	0	3	...	...	...	...
Ilion	5,138	4	....	0	0	0	...	...	...	...
UTICA	56,383	94	19.0	14	12	18	1	2	...	...
Whitestown	6,235	8	....	1	1	1	...	1	...	...
ROME	15,343	24	....	0	1	10	...	1	...	...
Boonville	3,332	3	....	1	0	1	...	...	...	...
Camden	3,745	5	....	0	0	0	...	...	...	...
Waterford	6,157	6	....	2	0	3	...	...	...	...
Mechanicville	4,695	2	....	1	0	0	...	...	...	...
Ballston Spa	3,923	7	....	0	0	2	...	...	...	...
Saratoga Springs	12,409	26	....	2	1	9	1	3	...	...
Rest of District	183,250	187	13.0	13	7	57	1	7	...	...
SOUTHERN TIER DISTRICT Totals	433,000	510	14.0	55	18	138	1	12	...	...
BINGHAMTON	40,000	50	15.0	4	0	8	...	...	...	...
Owego	5,039	7	....	1	1	1	...	...	...	...
Candor	3,330	9	....	1	0	1	...	...	...	...
Waverly	4,500	6	....	0	0	3	...	...	...	...
ELMIRA	35,672	46	....	4	2	15	...	...	...	...

FOR OCTOBER—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
1				1		1		1					2			3		1
					1	1							2		1			1
											1	2	2		1	1		
			1			3	1						1	1			1	
			2	3	17	26	11	12		30	21	46	51	6	22	17	7	22
6		1	1	8	13	44	23	12	3	34	23	58	51	19	28	29	14	35
								1		4	2	2	3		2		1	4
										1	2	2						
						1								1		1		
				4						2	1	2	1					
						1	1	1		1		2	1			1		1
												1	1					
												1						1
							1			1			1		2	2	1	1
					1				1	1			1		1			
						2	5				1		1		2	2		1
										3	2	4	2	1	3			3
						2							2		1			
							2			1				1	1		1	
						1											1	
					1		1	1			2				1	2		
											1		2					1
										2		2		1				
6		1	1	4	11	37	13	9	2	18	12	42	36	15	15	21	10	23
10			1	5	19	38	25	15	4	46	29	74	70	33	44	35	28	38
				1	6	4	3	4		4	1	5	10	5	8		3	5
				1			1			1			1				1	1
					4	4	1		1	6	3	3	8	8	4	3	1	7
						1							1		1		1	
													2					1
1										3	3	3	1	2	3		2	2
						1		1		2	1	1	2		2	2		1
											1				1	2	2	1
						1				1			1				1	
7			1	1	4	5	9	1		8	7	17	8	1	5	5	7	5
												3	1	1		1		1
						2	4	1		1		4	2		1	5	2	1
												1	2					
						2						2				1		
						1							1	1		1	1	1
										1		1						
										1		1	1	1	2			1
				1			3	3		2		4	1	1	1	3		3
2				1	5	17	4	5	3	16	13	29	28	13	16	12	7	8
1			1	13	13	39	19	12	4	49	30	60	78	39	35	38	19	47
				2		7	2			6	4	8	8	5	1	1	1	5
						1				1		1	1	2				1
					1							3	1		1	2	1	
						1						2			1	1		1
				2	1	4	3	3		2	5		6	8	4	4		4

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DIST.—(*Con.*)										
Horseheads	5,000	10	....	0	0	3	...	...	...	...
HORNELLSVILLE	12,000	15	....	2	1	1	...	...	...	...
Bath	5,000	8	....	1	0	2	...	1	...	...
CORNING	11,061	19	....	3	1	4	...	...	...	...
Wellsville	5,000	5	....	0	0	3	...	...	...	...
OLEAN	9,462	5	....	1	0	1	...	...	...	...
Salamanca	4,251	9	....	3	1	4	...	...	...	...
DUNKIRK	15,000	13	....	4	1	2	...	2	...	...
JAMESTOWN	22,892	27	13.8	3	0	9	...	3	...	...
Westfield	2,430	10	....	2	0	3	...	1	...	...
Fredonia	4,125	3	....	0	0	1	...	...	...	...
Rest of District	248,600	268	14.3	26	11	87	1	5	...	...
EAST CENTRAL DISTRICT Totals	404,500	512	15.0	63	13	173	1	8	...	...
SYRACUSE	110,000	133	14.0	23	8	25	1	3	...	...
Baldwinsville	3,000	4	....	0	0	1	...	...	...	...
DeWitt	5,435	5	....	0	0	2	...	...	...	...
CORTLAND	9,014	15	....	4	0	5	...	...	...	...
Homer	2,381	6	....	1	0	2	...	...	...	...
ONEIDA	7,942	8	....	1	0	3	...	...	...	...
Hamilton	3,744	4	....	1	0	2	...	...	...	...
Cazenovia	3,830	4	....	0	0	3	...	...	...	...
Canastota	3,300	2	....	1	0	0	...	...	...	...
Norwich	5,766	8	....	0	0	3	...	...	...	...
Oneonta	7,147	8	....	0	0	2	...	...	...	...
Worcester	2,409	1	....	0	0	0	...	...	...	...
Cooperstown	2,368	2	....	0	0	0	...	...	...	...
Walton	4,869	6	....	2	0	1	...	...	...	...
Delhi	3,243	13	....	3	0	5	...	...	...	...
Liberty	4,568	13	....	2	0	1	...	...	...	...
Rest of District	225,540	280	15.0	25	5	118	...	5	...	...
WEST CENTRAL DISTRICT Totals	320,600	384	14.0	39	15	126	1	9	...	...
AUBURN	35,000	38	13.0	5	2	5	...	1	...	...
ITHACA	13,136	12	....	0	0	5	...	...	...	...
Hector	4,137	3	....	0	1	1	...	1	...	...
Waterloo	4,256	7	....	0	0	1	...	...	...	...
Seneca Falls	6,519	8	....	2	0	2	...	...	...	...
GENEVA	10,433	16	....	5	0	2	1	...	...	...
Canandaigua	6,151	9	....	3	0	1	...	...	...	...
Manchester	4,733	4	....	0	0	1	...	...	...	...
Phelps	4,788	5	....	0	0	1	...	...	...	...
Penn Yan	4,650	6	....	0	0	0	...	1	...	...
Batavia	9,180	11	....	2	0	1	...	...	...	...
Dansville	3,633	6	....	0	0	0	...	...	...	...
Le Roy	3,144	4	....	0	1	1	...	...	...	...
Warsaw	4,341	5	....	0	0	2	...	...	...	...
Rest of District	206,500	250	15.0	22	11	103	...	6	...	...
LAKE ONTARIO AND WESTERN DISTRICT Total	915,200	1,064	14.0	173	65	260	6	32	2	...
Buffalo	380,000	451	14.0	92	45	70	6	19	...	...
TONAWANDA	7,421	10	....	1	0	2	...	1	...	...
Amherst	4,223	3	....	0	0	2	...	...	...	...
NORTH TONAWANDA	9,069	11	....	1	0	1	...	3	...	...
LOCKPORT	16,581	21	....	3	1	9	...	1	...	...

for October—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
						3		2				1	1	1	1			1
				2		1	1			3	1	1	2		1			3
												3	3					1
					1	2	1			2		1	2	3	3	2		2
															1	2	1	1
							1						2				2	
					2		1			3			1					2
1				1	1					2		3			1		1	1
			1					2	2	1	1	2	8	1	2	2		2
					1	1						2	1	2		1		1
											1				1	1		
				6	6	19	10	5	2	29	18	33	42	17	18	22	13	22
2		1	1	7	10	47	23	16	1	44	35	84	72	37	29	42	17	35
1		1		2	2	9	3	6		9	12	21	14	7	10	9	8	15
						1						1	2					
												2			2	1		
						1	1	1		1	2	2	3	2	1		1	
					1	1				1			1		1	1		
						1					1	1	2	1	1			1
							1			1		1				1		
						1					1	1	1					
						1						1						
						1	1			1		1		1	1	1	1	
						1	1	1		1	1	1			1	1		
														1				
						1												1
						2	1	1				1						1
								2	1	1	2	3				2		2
						6				1		2	1		1		1	1
.1			1	5	7	21	15	5		28	16	46	48	25	11	26	6	14
				3	22	27	16	8	2	31	21	56	58	33	24	32	19	22
				1	2	7		1		5		6	3	2	2	3	2	3
							2				1	4		5				
											1			1				
							1	1			1		1		1	1		1
					2	1	1					1	3					
					2	2		1		2	2	1	3					2
										1		1	3	2			1	1
										1	2						1	
						1				1		1	1		1			
						2							1		1		1	
				1	2		1		2	1		1	2	1				
						1						1	2	1			1	
					1						1				1	1		
										2	1	1					1	
				1	13	13	11	5		18	12	39	39	21	18	27	12	15
3	1	2	2	24	53	85	48	41	13	76	59	147	121	65	76	60	58	90
1	1	1	1	9	33	38	27	25	5	22	28	53	37	28	32	17	25	43
						2		1			1		2		1	1	1	
										1		1	1					
				1		2			1	2		1		1				
				2		1				3	1	4	1	1	1	2	2	2

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC			
							Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*)										
NIAGARA FALLS	25,000	24	12.0	3	1	5	...	2	...	...
Medina	4,716	10	....	2	0	4	...	...	...	...
Albion	4,477	9	....	1	0	4	...	...	...	...
Brockport	3,400	2	....	0	0	2	...	...	...	...
ROCHESTER	165,000	189	13.0	28	8	31	...	1	1	...
Palmyra	3,758	12	....	1	1	5	...	1	...	...
Newark	4,578	5	....	1	0	1	...	...	...	...
Lyons	5,824	10	....	1	0	5	...	...	...	...
Clyde	2,507	3	....	0	0	0	...	...	...	...
OSWEGO	22,200	21	12.0	2	1	5	...	1	...	...
FULTON	8,734	10	....	1	0	2	...	...	...	...
Richland	3,535	2	....	0	0	1	...	...	...	...
Rest of District	244,184	271	13.5	36	8	111	...	3	1	...
Totals for the State	7,746,000	9,906	15.0	1,747	730	1,735	75	201	13	1
Average for past five years	....	9,591	16.0	......	*2,732	1,660	34	228	27	4

* All deaths under 5 years of age.

REMARKS.—The moderate excess of rainfall generally throughout the State in September has given place to a moderate deficiency, chiefly of western half and on the seaboard; being in contrast with a year ago when the precipitation was about double the average for the month. The temperature continues as it has been since June, subnormal, the average of the mean temperature for the month of the several stations being 49 degrees, which is two degrees below the average for the past thirty years. The lowest mean temperature for the month in the past thirty years has been 46 degrees and the highest 58 degrees. Highest temperatures fell during the third week, and lowest, reaching 25 degrees, during the last week of the month. There is an accumulated deficiency in temperature since the first of the year of 663 degrees. For the year, precipitation is deficient in the east and west, and excessive in the central part of the State.

FOURTH ANNUAL CONFERENCE OF SANITARY OFFICERS.—There has been sent out to the presidents of local boards of health a notice of the annual conference of sanitary officers in this State, which is to be held now for the fourth time under the direction of the State Department of Health. It will be held in the Assembly Chamber of the Capitol in Albany, beginning with an afternoon session on the 15th of December and continuing through the next day.

As stated in the current notice, the purpose of this gathering is to secure a uniform system of sanitation throughout the State and to increase the efficiency of local boards of health. The central office is, in a general way, for this purpose, and accomplishes it by the daily work throughout the year of correspondence and contact with members of local boards or their officers who come here or are met in their own field by some one representing the State Department. The annual conference makes it possible to meet a large body of representatives of local boards who can exchange experience and bring forward for discussion all questions affecting practical work, while also men competent to instruct can find a large audience for presenting important and practical information. The Department in this way reaches many at once instead of dealing with the individual board, and subjects concerning which advice is most commonly sought can be presented to many. Withal, uniformity in work, which is desirable throughout the State, under common laws and with like conditions, can be secured; for while much of sanitary work is of universal application, each State will have that affecting powers and procedures that is its own.

It is especially desirable that there should be a good attendance of health officers. These now having, under present law, a fixed term of service of four years and appointment by the State Commissioner of Health on the nomination of their local board of health, have every reason to fit themselves in sanitary science for their official work as advisors and executive officers of their local boards. The Department is anxious to secure their attendance at the conference, as likewise of registrars. Provision has been made by amendment to section 21 of the Public Health Law for local boards of health to allow the reasonable expenses of health officers in attending the annual conference, and every community will be fully compensated for the expenditure in the increased efficiency of its sanitary advisor from what he will gain by attendance at this meeting.

The program of the meeting has not been completed. Dr. Harvey W. Wylie, chief of the bureau of chemistry connected with the Department of Agriculture at Washington, who has been pursuing

FOR OCTOBER—(*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	...	1	2	1	1	1	...	1	1	3	2	...	1	2	4	2
....	...	...	...	...	1	1	.....	1	...	.....	2	2	1	1	...	1	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	1	3	1	2	...	1	.....	1
....	...	...	...	...	.....	.....	1	.....	...	.....	.....	.....	.....	...	...	...	1	.....
....	...	...	...	8	8	21	8	8	4	18	10	24	25	10	11	9	8	15
....	...	...	...	...	1	1	1	1	...	1	.....	1	2	1	...	2	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	1	.....	2	2	...	...	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	1	2	1	.....	1	1	2	1	.....	1
....	...	...	...	...	.....	1	.....	.....	...	.....	1	1	.....	...	...	...	.....	.....
....	...	...	...	1	1	3	.....	.....	...	1	.....	6	1	2	2	...	2	1
....	...	...	...	...	.....	1	.....	.....	1	1	1	1	.....	1	1	1	1	1
....	...	...	...	...	.....	.....	.....	.....	...	1	1	.....	.....	...	...	...	.....	.....
2	...	1	1	2	7	13	10	4	1	22	11	45	45	17	25	23	14	24
56	25	11	26	203	576	1,069	800	275	77	611	766	1,115	991	507	658	384	431	1,035
40	22	13	52	243	603	1,064	.....	†1,000	65	735	774	928	1,006	413	571	409	.....	‡1,360

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

investigations for the Federal Government in the adulteration of food and food products, has been asked to address the conference on the subject connected with his work, and further discussion will be by the director of our Bureau of Chemistry, Dr. Willis G. Tucker. In connection with the important subject of sewage disposal which is now interesting many villages in the State and is becoming more and more a matter of concern as well as of investigation of method, the recently established disposal system on an elaborate scale, and which is a model of its kind, at Saratoga Springs, will be reported on and the subject discussed by Dr. D. C. Moriarta, president of the sewer commission of that village. Dr. Wallace Clarke, health officer of Utica, will present the subject of Disinfectants, and probably especially of the practical uses of formaldehyde, concerning which he is a competent speaker. Circulating libraries on a great variety of topics now form an important part of the work of the State Library, and the matter of establishing such, under the State Department of Health, connected with the subject of sanitation, by which recent and authoritative books relating to public health can be brought within the reach of our health boards throughout the State, will be presented by the consulting engineer of the Department, Mr. Olin H. Landreth. Dr. Richard M. Pearce, director of the Bureau of Pathology and Bacteriology, is expected to give a paper, with lantern slide demonstrations, on Pathogenic Protozoa, a series of recent investigations. The Public Health Law and its practical application has been heretofore a subject of address and interested discussion, many questions regarding the powers and duties of the health officer under its provisions being answered, and decisions of courts upon questions coming before them given by an attorney; this subject will be again discussed at the coming conference.

HEALTH OF THE STATE.—The 9,900 deaths during the month are 300 in excess of the average of the past five years, and a little more than in October of any past year, the relative mortality to population not, however, increasing as the death rate is 16.0, which is rather below the average. The number of deaths from epidemic diseases, which is a fair measure of the health of the State, is in fact less than the average and less than occurred last October, and likewise, there were of deaths under five years of age 2,477, against an average of 2,732. *Typhoid fever* usually reaches its height in October, having a little larger mortality most years than in September, and causing from 200 to 300 deaths, with an average of 230; there were this month 200 deaths from this cause. There have been a number of minor epidemics investigated this fall and a notable fact regarding them has been the tracing of an origin to the importation of the outbreak to localities previously free for years by a convalescent. It is a fact to be emphasized that convalescents continue to give off in their discharges typhoid germs for at least several weeks after clinical symptoms have abated, and attention to this should be given by health officers and physicians. *Diarrheal diseases* have caused 576 deaths against an average of 603, but these are only of deaths under the age of five years, and, not including New York city, 54 should be added to this number of deaths for acute diarrheal diseases over this age, dysentery and entero-colitis, mostly at sixty-five and over. Of the deaths under five years, 423 occurred in five large cities, less than 10 deaths for 100,000 population, and in rural towns there were 20 to the same population. *Diphtheria* has the lowest mortality for October on our records. *Smallpox* continues n a few localities, but few in number.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following
during Nove

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns in

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC			
							Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT										
Totals	4,158,600	5,905	17.2	936	511	810	50	80	8	...
CITY OF NEW YORK										
Totals	3,838,024	5,455	17.3	868	488	725	50	74	6	...
BOROUGH OF MANHATTAN	1,940,121	2,961	18.0	489	250	302	41	28	2	...
BOROUGH OF THE BRONX	294,039	396	16.3	57	38	41	2	2	...	...
BOROUGH OF BROOKLYN	1,334,052	1,784	16.2	273	181	227	7	41	2	..
BOROUGH OF QUEENS	193,494	218	13.7	42	14	36	...	3	1	...
BOROUGH OF RICHMOND	74,158	96	15.4	7	5	19	...	...	1	...
Oyster Bay	16,334	22	....	4	2	6	...	...	...	...
Hempstead	27,066	24	12.0	2	2	4	...	...	...	...
North Hempstead	12,048	19	....	1	1	5	...	...	...	...
Southold	8,301	10	....	0	1	2	...	...	...	...
Sag Harbor	3,500	3	....	1	0	1	...	...	...	...
Huntington	9,483	7	....	1	0	2	...	...	...	...
Brookhaven	14,592	15	....	2	0	6	...	...	...	...
YONKERS	50,000	84	20.8	20	7	16	...	2	...	...
Greenburg	15,564	14	....	1	0	3	...	...	2	...
MOUNT VERNON	20,346	24	14.4	6	1	4	...	...	...	...
Port Chester	7,440	14	....	3	1	3	...	...	...	...
Ossining	7,939	16	....	2	0	1	...	...	...	...
NEW ROCHELLE	14,720	14	....	4	0	0	...	...	...	...
Peekskill	10,358	21	....	5	1	5	...	...	...	...
White Plains	7,900	18	....	2	0	5	...	...	...	...
Rest of District	95,000	145	18.3	14	7	22	...	4	...	...
HUDSON VALLEY DISTRICT										
Totals	696,000	937	16.3	117	45	231	10	15	...	...
ALBANY	100,000	131	16.0	7	5	26	3	1	...	...
COHOES	24,000	48	24.9	10	6	4	1	...	...	...
TROY	75,057	116	18.8	25	8	18	...	1	...	...
WATERVLIET	14,321	14	....	0	1	2	...	...	...	...
Green Island	4,770	4	....	0	1	1	...	...	...	...
Hoosick Falls	5,671	7	....	0	0	0	...	...	...	...
RENSSELAER	*10,000	12	....	3	0	1	1	1	...	...
Coxsackie	4,102	10	....	0	1	3	1	1	...	...
Catskill	5,486	8	....	2	0	2	...	...	...	...
HUDSON	9,528	7	....	0	0	3	...	...	...	...
KINGSTON	24,535	47	23.3	9	2	14	...	...	...	...
Ellenville	3,000	5	....	1	0	1	...	...	...	...
Marbletown	3,511	2	....	0	0	2	...	...	...	...
Rosendale	6,278	3	....	2	0	0	...	...	...	...
Esopus	4,907	5	....	0	0	1	...	...	...	...
Saugerties	3,700	8	....	2	0	4	...	...	...	...
POUGHKEEPSIE	24,029	31	16.1	3	2	9	...	...	...	...
Fishkill	13,016	28	....	2	1	6	...	...	...	...
Wappingers Falls	3,504	4	....	1	0	0	...	...	...	...
NEWBURGH	25,000	39	19.1	7	0	8	...	2	...	...
Port Jervis	9,385	20	....	3	0	3	...	1	...	...
MIDDLETOWN	14,522	15	....	0	0	5	...	...	...	...
Warwick	6,403	5	....	2	0	0	...	...	...	...
Goshen	4,564	9	....	2	2	4	1	...	...	...

* The population of Rensselaer was increased in 1902 by the addition of Bath-on-the-Hudson to 10,000.

DEPARTMENT OF HEALTH—VOLUME XX.

districts, cities, villages and towns in the State of New York

Roman type. Population estimated to date printed in full face figures.]

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
49	28	12	12	145	149	718	929	183	48	279	578	565	480	285	337	91	301	578
49	26	11	11	135	143	670	878	157	44	247	551	523	410	264	308	73	290	535
13	8	7	7	46	88	351	478	72	19	134	303	290	238	146	181	25	189	295
18	9	1	1	11	7	97	40	16	2	21	40	27	20	11	16	1	26	28
18	9	3	3	70	44	200	314	49	20	70	181	158	136	92	86	41	68	172
....	...	...	...	5	2	18	32	15	3	14	13	33	7	10	18	5	5	34
....	...	...	...	3	2	4	14	5	...	8	14	15	9	5	7	1	2	6
....	...	...	...	...	.....	1	.....	2	...	1	.....	2	2	1	5	3	1	4
....	...	...	...	2	.....	5	3	3	...	.....	2	3	2	2	...	...	.....	2
....	...	...	...	...	.....	1	1	1	...	3	.....	5	3	3	2	...	.....	.....
....	...	...	...	...	.....	2	.....	1	...	1	.....	.....	3	...	1	1	.....	1
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	2	...	...	...	.....	1
....	...	...	...	...	.....	.....	1	1	...	1	.....	.....	.....	...	2	2	.....	.....
....	...	...	...	...	.....	1	.....	.....	1	1	1	.....	5	...	1	2	2	1
....	...	...	...	2	3	6	22	2	...	3	4	8	13	3	4	1	1	10
....	...	...	...	...	.....	1	.....	.....	...	2	.....	.....	3	2	1	1	.....	2
....	...	...	...	...	1	2	2	1	1	.....	4	3	1	1	2	1	1	4
....	...	...	...	3	.....	.....	2	2	...	1	.....	1	2	...	1	1	.....	1
....	...	...	...	...	.....	3	3	2	...	.....	1	.....	5	...	1	...	.....	1
....	...	...	...	...	.....	2	1	2	...	2	1	1	1	2	...	...	.....	2
....	...	1	...	...	.....	1	3	3	...	3	.....	2	4	...	...	2	.....	2
....	...	...	...	...	.....	1	2	1	...	1	.....	1	5	...	1	1	1	4
....	2	...	1	3	2	22	11	5	2	13	14	16	19	7	8	3	5	8
1	1	1	8	15	4	103	79	52	6	67	82	113	118	50	58	50	36	68
....	...	...	...	2	.....	17	10	2	...	7	20	21	9	13	9	5	8	4
....	...	...	...	...	1	7	1	5	...	5	3	4	6	3	6	1	1	4
....	...	...	1	2	.....	14	10	13	...	9	6	13	12	5	4	4	4	18
....	...	...	...	1	.....	2	3	1	...	.....	.....	1	1	1	1	2	.....	1
....	...	...	...	...	.....	.....	.....	.....	...	1	1	.....	1	1	...	...	.....	.....
....	...	...	...	...	.....	2	.....	1	...	.....	.....	4	.....	...	...	...	.....	.....
....	...	...	...	...	.....	1	3	.....	...	.....	1	2	.....	...	...	1	1	1
....	...	...	...	...	.....	1	2	.....	...	1	1	.....	.....	1	...	1	.....	1
....	...	...	...	...	1	1	.....	.....	...	2	1	.....	.....	...	...	...	1	2
....	...	...	...	...	.....	2	.....	.....	...	1	.....	2	.....	...	1	...	1	.....
....	...	...	...	...	1	2	2	2	...	3	4	7	12	1	2	3	2	6
....	...	...	...	...	.....	.....	3	.....	...	.....	.....	.....	.....	...	...	...	1	1
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	.....	...	...	1	1	.....
....	...	...	...	...	.....	.....	.....	.....	...	1	.....	1	.....	...	1	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	1	1	1	1	...	...	1	.....	.....
....	...	...	...	...	.....	.....	1	.....	...	1	.....	2	1	2	...	...	.....	1
....	...	...	...	...	.....	7	3	3	1	2	.....	5	2	2	...	2	2	2
....	...	...	...	1	.....	6	1	3	...	1	3	4	2	...	3	1	2	1
....	...	...	...	...	.....	1	.....	.....	...	.....	1	.....	.....	1	...	...	.....	1
....	...	...	2	2	.....	6	4	3	...	1	5	6	2	...	2	1	1	2
....	...	...	...	2	.....	2	1	1	...	3	.....	2	1	...	2	3	1	1
....	...	...	...	...	.....	1	1	.....	1	.....	.....	2	3	1	4	2	.....	.....
....	...	1	...	...	.....	.....	.....	1	...	.....	2	.....	.....	...	...	...	.....	1
....	...	...	...	...	.....	1	.....	.....	...	.....	2	.....	1	...	...	2	.....	2

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DIST.—(*Con.*)										
Montgomery	5,939	6	....	1	0	1	...	...	...	...
Haverstraw	9,874	11	....	1	1	1	...	2	...	...
Nyack	4,275	9	....	0	0	4	...	...	...	...
Ramapo	7,502	15	....	3	0	4	...	...	...	...
Rest of District	271,800	318	14.5	31	15	104	3	6	...	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	426	13.0	48	19	156	4	5	...	...
Watertown	21,700	27	15.1	2	1	7	...	1	...	...
Ellisburg	3,888	6	....	0	0	5	...	...	...	...
Cape Vincent	2,882	......	....	......	......	......	...	...	...	...
Clayton	4,313	6	....	1	0	2	...	...	...	...
Ogdensburg	12,633	22	22.0	1	0	8	...	...	...	...
Gouvérneur	6,000	5	....	2	0	2	...	...	...	...
Potsdam	3,843	8	....	1	0	4	...	...	...	...
Canton	6,387	3	....	0	0	2	...	...	...	...
Malone	5,935	4	....	1	0	1	...	...	...	...
Plattsburg	8,434	11	....	1	1	2	...	...	...	...
Glens Falls	12,613	20	20.0	3	1	5	...	...	...	...
Whitehall	4,377	2	....	0	0	0	...	...	...	...
Fort Edward	5,216	8	....	1	0	3	...	...	...	...
Sandy Hill	4,473	6	....	0	1	4	1	...	...	...
Granville	5,217	1	....	0	0	1	...	...	...	...
Greenwich	4,172	10	....	2	0	4	...	...	...	...
Lowville	3,746	2	....	0	0	2	...	...	...	...
Rest of District	279,000	285	12.5	33	15	104	3	4	...	...
MOHAWK VALLEY DISTRICT Totals	428,400	538	15.6	48	29	172	5	3	...	...
Schenectady	56,000	52	12.0	7	3	13	2	...	...	...
Cobleskill	3,973	4	....	1	0	1	...	...	...	...
Amsterdam	20,929	20	12.0	2	1	2	...	...	...	...
Fort Plain	2,444	4	....	0	0	2	...	...	...	...
Johnstown	10,130	8	....	1	0	5	...	...	...	...
Gloversville	18,349	16	11.0	1	0	3	...	...	...	...
Little Falls	10,381	15	....	1	0	3	...	...	...	...
Herkimer	5,555	4	....	1	0	1	...	...	...	...
Ilion	5,138	2	....	0	1	0	...	...	...	...
Utica	56,383	106	22.0	13	13	19	...	2	...	...
Whitestown	6,235	9	....	1	1	1	...	...	...	...
Rome	15,343	23	....	3	1	8	...	...	...	...
Boonville	3,332	2	....	0	0	0	...	...	...	...
Camden	3,745	4	....	0	0	1	...	...	...	...
Waterford	6,157	7	....	1	0	2	...	...	...	...
Mechanicville	4,695	15	....	2	1	2	2	...	...	...
Ballston Spa	3,923	3	....	0	0	1	...	...	...	...
Saratoga Springs	12,409	18	18.0	1	1	7	...	...	...	...
Rest of District	183,250	226	14.5	13	7	100	1	1	...	...
SOUTHERN TIER DISTRICT Totals	433,000	495	14.0	40	13	161	...	14	2	...
Binghamton	40,000	52	16.0	3	1	11	...	...	1	...
Owego	5,039	8	....	0	0	5	...	1	...	...
Candor	3,330	5	....	0	0	3	...	...	...	...
Waverly	4,500	1	....	0	0	1	...	...	...	...
Elmira	35,672	43	14.5	0	1	11	...	4	...	...

FOR NOVEMBER—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
							1	1	1		1					1		1
							2	1					1	1	3			1
										1	4	1		2	1			
			1				2			2		4	2		1	1		2
1	1		4	5	1	30	29	15	3	25	26	31	61	16	18	18	10	15
			1	4	6	45	17	16	2	36	22	66	66	28	25	36	15	32
						4	1			2		7	4	2	2	2	1	1
										1		2		2		1		
				1		2							2	1				
						2	1	1			2	2	2	2	2	4	2	2
												2				1		2
			1			2				3		2						
								1						1	1			
								1				1	1					1
						2			1			3	4		1			
				1		1	1	1	1	1		4	2	1	2	2		3
								1			1							
										1		2			1	2	1	1
										1		2	2					
																1		
						1				1		2	1	1		2	1	1
													2					
				2	6	81	14	11		26	19	37	46	18	16	21	10	21
9	2	1	...	15	7	42	30	16	4	45	36	81	70	40	33	37	30	32
2				2		7	3	1	1	2	5	6	3	5	5	3	1	4
							1				1	1			1			
						3		2		1	2	3	3	1	1	1	3	
											1	1	2					
		1								2		2	2	1				
				1		2				1		1	2	2	1	2	3	1
				1		3				2		2	3			2		2
								1					1		1			1
				1									1					
6	1			4	2	8	11	5	1	7	7	13	14	6	2	1	7	9
1							1			1	2	2	1				1	
						1	1		1	2	4	3	2		4	1	1	3
												1					1	
										2		1					1	
							1	1				2	2					1
				2	1	1		1					3	1	2	1	1	
						1				1					1			
				1		2	2			1	2		1	3	3	1	1	1
	1			3	4	14	10	5	1	23	12	43	30	21	12	25	10	10
1	...	1	4	18	5	30	26	12	1	41	34	80	62	28	37	48	20	31
				3	1	5	3			8	5	6	10	5	2	1		2
										1		2	1			3		
												1	1	1		2		
											1							
		1		4		2	3	2		1	6	6	4	2	3		5	

SANITARY DISTRICTS	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Death at 70 years and over.	EPIDEMIC: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DIST.—(*Con.*)										
Horseheads	5,000	6	....	0	0	0	...	...	...	...
HORNELLSVILLE	12,000	16	16.0	4	0	4	...	1	...	...
Bath	5,000	6	....	0	0	2	...	...	...	...
CORNING	11,061	17	....	2	2	1	...	1	...	...
Wellsville	5,000	6	....	0	0	3	...	...	...	...
OLEAN	9,462	9	....	0	0	2	...	...	...	...
Salamanca	4,251	13	....	1	2	3	...	...	...	...
DUNKIRK	15,000	10	....	0	0	2	...	...	...	...
JAMESTOWN	22,892	28	15.0	4	0	9	...	...	...	...
Westfield	2,430	1	....	0	0	0	...	...	...	...
Fredonia	4,125	3	....	1	0	0	...	...	...	...
Rest of District	248,600	271	13.2	25	7	104	...	7	1	...
EAST CENTRAL DISTRICT Totals	404,500	448	13.1	46	14	147	2	9	...	...
SYRACUSE	110,000	112	12.5	15	5	18	...	...	...	...
Baldwinsville	3,000	8	....	0	0	0	...	2	...	...
DeWitt	5,435	6	....	2	0	0	...	...	...	...
CORTLAND	9,014	14	....	2	0	2	...	1	...	...
Homer	2,381	1	....	0	0	0	...	...	...	...
ONEIDA	7,942	6	....	0	0	3	...	...	...	...
Hamilton	3,744	2	....	0	0	1	...	...	...	...
Cazenovia	3,830	1	....	0	0	0	...	...	...	...
Canastota	3,300	6	....	0	1	3	...	...	...	...
Norwich	5,766	8	....	1	1	5	...	...	...	...
Oneonta	7,147	10	....	2	1	2	...	...	...	...
Worcester	2,409	4	....	1	0	1	...	...	...	...
Cooperstown	2,368	4	....	0	0	2	...	...	...	...
Walton	4,869	4	....	0	0	1	...	...	...	...
Delhi	3,243	4	....	0	0	3	...	1	...	...
Liberty	4,568	10	....	1	0	0	...	...	...	...
Rest of District	225,540	248	13.0	22	6	106	2	5	...	...
WEST CENTRAL DISTRICT Totals	320,600	397	15.2	26	11	162	1	7	1	...
AUBURN	35,000	30	10.5	4	0	10	...	2	...	...
ITHACA	13,136	18	....	1	0	4	...	...	...	...
Hector	4,137	4	....	1	0	3	...	...	...	...
Waterloo	4,256	1	....	0	0	0	...	...	...	...
Seneca Falls	6,519	1	....	0	0	0	...	...	...	...
GENEVA	10,433	17	....	2	0	4	...	1	...	...
Canandaigua	6,151	13	....	1	0	3	1	...	...	...
Manchester	4,733	.....	....	.....	.....	.....	...	...	...	...
Phelps	4,788	6	....	0	1	3	...	...	...	...
Penn Yan	4,650	5	....	0	0	3	...	...	...	...
Batavia	9,180	10	....	0	1	3	...	1	...	...
Dansville	3,633	2	....	0	0	1	...	...	...	...
Le Roy	3,144	2	....	0	0	2	...	...	...	...
Warsaw	4,341	6	....	0	1	2	...	...	...	...
Rest of District	206,500	282	16.0	17	8	124	...	3	1	...
LAKE ONTARIO AND WESTERN DISTRICT Total	915,200	1,039	14.0	146	67	255	3	14	1	...
BUFFALO	380,000	434	14.0	69	48	68	2	5	...	...
TONAWANDA	7,421	5	....	1	0	2	...	...	...	...
Amherst	4,223	2	....	0	0	0	...	...	...	...
NORTH TONAWANDA	9,069	12	....	3	1	2	1	...	...	...
LOCKPORT	16,581	24	....	1	2	8	...	...	1	...

for November—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
...	...	...	...	...	...	1	...	...	...	...	...	...	2	...	1	1	...	1
...	...	...	...	...	...	...	1	...	...	2	1	2	1	1	1	2	...	4
...	...	...	...	...	...	1	...	...	...	1	...	2	1	1	...	...	...	...
...	...	...	...	3	...	...	3	2	...	1	1	...	2	1	2	...	...	1
...	...	...	...	...	...	1	1	...	...	...	2	...	1	...	...	...	1	...
...	...	...	...	...	...	1	1	...	...	...	...	2	1	1	1	1	...	1
...	...	...	...	...	1	1	...	...	...	2	1	...	...	...	2	3	...	8
...	...	...	...	1	...	...	...	...	1	2	...	2	...	2	2	...	...	...
1	...	...	1	1	...	2	1	1	...	1	1	5	...	...	3	5	3	3
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	1
...	...	...	3	6	3	16	13	7	...	22	16	52	37	13	20	30	10	15
...	4	3	...	7	2	44	35	10	5	26	34	60	62	32	25	33	16	39
...	...	...	...	1	2	17	8	3	2	5	11	15	11	11	7	4	3	12
...	...	...	...	...	...	...	...	...	...	1	1	3	...	...	1	...	...	...
...	...	...	...	...	...	1	...	...	...	...	...	3	...	...	...	...	...	2
...	...	...	...	...	...	1	3	...	...	1	2	2	1	2	...	...	...	1
...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	1	...	...	1	...	...	2	...	1	1	...	...
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...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	2	...	...	1
...	...	...	...	...	...	...	1	...	...	...	1	1	2	1	...	1	1	...
...	...	...	...	...	...	...	...	1	...	2	...	1	1	1	2	...	1	1
...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	1	...	1
...	...	...	...	...	...	...	2	...	...	...	1	...	...	1	...	...	...	...
...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2
...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	1	...	...
...	...	...	...	...	...	8	...	...	...	1	...	1	...	...	...	...	...	...
...	4	2	...	5	...	16	20	6	3	14	17	29	44	15	12	25	10	19
1	1	...	...	2	10	33	25	10	...	36	36	62	57	21	24	36	23	11
...	...	...	...	...	1	3	1	...	...	3	2	2	4	3	3	3	1	2
...	...	...	...	...	...	3	4	1	...	...	2	3	...	1	2	1	1	...
...	...	...	...	...	...	...	...	2	...	1	...	...	...	...	...	1	...	...
...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...
...	...	...	...	1	...	...	4	...	...	...	2	4	1	1	...	2	...	1
...	...	...	...	...	1	1	1	...	...	...	...	1	3	1	2	...	2	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	1	2	1	1	...	...	1	...	...
...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	2	1	...
...	...	...	...	...	...	1	1	...	...	2	1	...	1	...	1	1	1	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...
...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...
...	...	...	...	...	...	...	1	...	...	...	...	1	3	1	...	...	...	...
1	1	...	...	1	8	24	13	6	...	28	27	47	44	14	16	24	16	8
2	10	3	2	35	22	89	79	54	8	67	83	128	128	56	70	73	38	74
2	9	2	1	19	14	38	33	29	6	28	34	38	48	19	30	25	21	31
...	...	...	...	...	...	...	...	...	...	...	1	...	1	1	1	...	...	1
...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...
...	...	...	1	...	...	1	1	2	...	...	...	2	1	...	1	1	...	1
...	...	...	...	1	...	3	...	2	...	5	...	6	1	...	2	2	1	...

MONTHLY BULLETIN

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of —	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Death at 70 years and over.	Epidemic: Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Continued*)										
NIAGARA FALLS	25,000	19	10.0	12	0	1	...	...	...	...
Medina	4,716	4	....	0	0	3	...	...	...	...
Albion	4,477	4	....	0	0	3	...	...	...	...
Brockport	3,400	8	....	2	0	3	...	...	...	...
ROCHESTER	165,000	193	14.0	19	5	47	...	4	...	...
Palmyra	3,758	7	....	0	0	3	...	...	...	...
Newark	4,578	11	....	1	0	5	...	...	...	...
Lyons	5,824	4	....	1	0	1	...	...	...	...
Clyde	2,507	1	....	0	1	0	...	...	...	...
OSWEGO	22,200	30	16.5	5	1	9	...	...	...	...
FULTON	8,734	14	....	8	1	6	...	...	...	...
Richland	3,535	5	....	0	0	2	...	...	...	...
Rest of District	244,184	262	13.3	29	8	92	...	5	...	...
Totals for the State	7,746,000	10,185	16.0	1,407	709	2,094	75	147	12	...
Average for past five years	....	9,130	15.2	......	*2,141	1,659	28	184	19	7

* All deaths under 5 years of age.

REMARKS.—In all parts of the State the rainfall is deficient, the temperature is below the normal, there is a low range or barometer, and there are comparatively few clear days. There was less than one inch of precipitation except upon the seaboard and a total deficiency for the month of two inches. There were from two to eight days at the different stations on which .01 inch of precipitation occurred. There was snowfall generally about the middle of the month with persistence of cold sufficient to retain traces of it through the month at Albany. The greatest amount of precipitation during November in the past thirty years (average for the State) is 4.61 and the lowest 1.20 inches, no year showing so small amount as that of the present report. In temperatures the average of the highest records in the several stations for thirty years is 46 degrees, and the lowest 38 degrees. The temperature is about the same as that of November, 1903, which was a cold month. The recorded prevailing winds is unusually variable, but mainly westerly and northerly with highest velocity of 45 miles in the hour.

THE NOVEMBER MORTALITY.—The well-nigh universal rule has always been according to past periods that November is the month of lowest mortality in the year. Last year for the first time there was an increase over both September and October, and the present month has a mortality 250 in excess of that of October. During the fifteen years preceding 1903 there were about 8,500 deaths in November, a daily rate of 280, against 339 this month. The increase is in excess of the population increase, the present death rate being 16.0 against 15.2 of the past five years.

Compared with the average of past years, the increase is not in infant mortality, which is numerically the same, nor in epidemic diseases the total of which is for both periods, alike, and in typhoid fever, diphtheria and diarrheal diseases is indeed materially less than the average, all of these having a low mortality. Acute respiratory diseases, 72 per cent. of which were from pneumonia, caused 250 more deaths than the average of the month; diseases of the circulatory system 200 more; those of the urinary system are 15 per cent. above the average, 8.0 per cent. of the deaths of the month having been from Bright's disease. There is also a large increase this month in the cancer mortality, which is larger than has heretofore occurred in any month but is not limited to any locality for it is general throughout the State. The chief cause of increase in the mortality of the month is pneumonia which caused 1,220 deaths against 800 in October; 12.0 per cent. of the total mortality was from this cause, against 9.4 per cent. last November, and 8.0 per cent. in October of this year. The deaths from Bright's disease nearly equaled the entire epidemic mortality and from pneumonia were fifty per cent. greater. The increase in both is universal. Although the deaths of early life are unusually low those of advanced age are excessive, 20.0 per cent. and in some districts even 40.0 per cent. of the deaths occurring at past the age of 70 years. Grippe has appeared on the death returns of the month, in connection with various other diseases, mostly acute respiratory, but the number has been small where it has been credited with contributing to mortality. Smallpox was widespread early in the year and during the fall in Washington and Saratoga counties, but has in the latter center subsided in good part; it now prevails moderately in places in Rockland and Westchester counties and also in Franklin county, and spread is threatened in some southern tier counties from a nearby out of the state center.

VACCINATION IN THE PUBLIC SCHOOLS has received constitutional standing by recent decision of the highest court in the State upholding our law in this respect, sec. 210, 211, of the Public Health Law, which requires that all unvaccinated persons shall be excluded from the public schools. This

FOR NOVEMBER—(*Concluded*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	...	...	2	.....	4	2	...	2	1	.....	2	1	2	...	1	2
....	...	...	...	...	.....	.....	1	.....	...	1	.....	.....	1	...	...	1	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	1	1	.....	...	...	2	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	2	2	.....	...	...	1	1	2
....	...	...	...	9	2	20	20	9	...	11	14	24	26	15	8	14	5	12
....	...	...	...	...	.....	1	.....	.....	...	.....	.....	1	3	...	...	1	.....	.....
....	...	...	...	...	.....	2	.....	.....	...	.....	1	3	1	...	1	2	.....	1
....	...	...	...	...	.....	.....	2	.....	...	1	1	.....	.....	...	...	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	.....	...	1	...	.....	.....
....	...	...	...	1	1	3	2	.....	...	2	.....	6	3	1	3	2	1	5
....	...	...	...	...	2	3	.....	.....	...	1	3	2	2	...	...	1	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	2	1	1	...	...	.....	1
....	1	1	...	5	1	17	15	10	2	16	25	41	38	17	21	21	8	18
63	46	21	27	241	205	1,104	1,220	353	74	597	905	1,155	1,043	540	609	404	479	865
59	45	14	43	303	241	1,026	.....	*1,310	70	596	776	943	994	401	517	386	.....	†1,168

* Includes all acute respiratory diseases. † Includes the preceding column.

is the nearest approach to compulsory vaccination in this State. Having passed the lower courts and been affirmed by the Court of Appeals, the full force of this law is established. It was contended on the trial that the mandatory clause of the Constitution of the State requiring school attendance forbade legislation restricting it to vaccinated children, and that every child has a constitutional right to an education; and evidence was adduced on the trial that vaccination does not confer immunity to smallpox and that it is offset by ills worse than smallpox. This last contention has been constantly controverted by the reports, investigations and records of this department. On this point Judge Vaun, who wrote the opinion of the Court, with remarkable clearness, says:

"The appellant claims that vaccination does not tend to prevent smallpox, but tends to bring about other diseases, and that it does much harm with no good. It must be conceded that some laymen, both learned and unlearned, and some physicians of great skill and repute, do not believe that vaccination is a preventive of smallpox. The common belief, however, is that it has a decided tendency to prevent the spread of this fearful disease and to render it less dangerous to those who contract it. While not accepted by all, it is accepted by the mass of the people as well as by most members of the medical profession. It has been general in our State and in most civilized nations for generations. It is generally accepted in theory and generally applied in practice, both by the voluntary action of the people and in obedience to the command of law. Nearly every state in the Union has statutes, to encourage or directly or indirectly to require vaccination, and this is true of most nations in Europe. It is required in nearly all the armies and navies of the world. Vaccination has been compulsory in England since 1854, and the last act upon the subject, passed in 1898, requires every child born in England to be vaccinated within six months of its birth. It is compulsory, or is aided, encouraged, and to some extent compelled in the other European nations. It is compulsory in but few states and cities in this country, but it is countenanced or promoted in substantially all, and statutes requiring children to be vaccinated in order to attend the public schools have generally been sustained by the courts."

The opinion further states that, a common belief like common knowledge may be acted on by the Legislature and courts without proof, and the fact that it is not universal is not controlling for there is scarcely any belief that is accepted by every one, and what the people believe is for the common welfare must be accepted as for the common welfare. "While we do not decide and can not decide that vaccination is a preventive of smallpox, we take judicial notice that this is the common belief of the people of the State, and with this fact as a foundation, we hold that the statute in question is a health law, enacted in a reasonable and proper exercise of the police power."

As to whether the Legislature is prohibited by the Constitution from enacting a law excluding unvaccinated children from the public schools, the opinion holds that right to attend public schools is necessarily subject to restrictions in the interest of the public health, as in the case of those having a contagious disease, and if vaccination strongly tends to prevent spread of smallpox it logically follows that children may be refused admission until they have been vaccinated. The police power which belongs to every sovereign state effects no invasion of the constitution when the sole object and general tendency of legislation is to promote the public health.

MONTHLY BULLETIN OF THE NEW YORK STATE

Tabulated abstract of deaths and their causes in the following during Dec

[Cities are printed in SMALL CAPITALS, villages in *italics* and towns

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Death at 70 years and over.	EPIDEMIC			
							Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
MARITIME DISTRICT Totals	4,158,600	6,820	20.0	1,100	700	889	95	74	10	...
CITY OF NEW YORK	3,838,024	6,335	19.5	1,035	672	779	91	69	10	...
BOROUGH OF MANHATTAN	1,940,121	3,467	20.5	610	384	347	68	40	2	...
BOROUGH OF THE BRONX	294,939	460	18.4	58	57	68	5	2	1	...
BOROUGH OF BROOKLYN	1,334,952	2,030	18.0	319	210	292	15	22	5	...
BOROUGH OF QUEENS	193,494	262	16.0	32	15	48	3	3	1	...
BOROUGH OF RICHMOND	74,158	116	18.5	16	6	24	...	2	1	...
Oyster Bay	16,334	9	....	0	1	4	...	...	...	...
Hempstead	27,066	33	14.5	4	0	8	...	1	...	...
North Hempstead	12,048	22	....	3	1	4	...	...	...	...
Southold	8,301	9	....	0	1	4	1	...	...	...
Sag Harbor	3,500	2	....	0	0	0	...	...	...	...
Huntington	9,483	13	....	2	0	7	...	...	...	...
Brookhaven	14,592	21	....	4	0	9	...	...	...	...
YONKERS	50,000	87	20.5	17	10	12	3	1	...	...
Greenburg	15,564	20	....	3	1	4	...	1	...	...
MOUNT VERNON	20,346	30	17.5	6	7	5	...	1	...	...
Port Chester	7,440	7	....	0	0	0	...	...	...	...
Ossining	7,939	11	....	1	1	2	...	1	...	...
NEW ROCHELLE	14,720	21	....	4	0	4	...	...	...	...
Peekskill	10,358	16	....	4	0	4	...	...	...	...
White Plains	7,900	12	....	1	1	3	...	...	...	...
Rest of District	95,000	172	22.0	19	5	40	...	...	...	...
HUDSON VALLEY DISTRICT Totals	696,000	1,055	18.5	121	67	259	5	11	1	...
ALBANY	100,000	151	17.8	14	6	16	...	...	...	...
COHOES	24,000	30	15.0	9	3	0	...	...	...	...
TROY	75,057	167	25.0	26	19	22	...	2	...	...
WATERVLIET	14,321	20	....	1	0	2	...	1	...	...
Green Island	4,770	10	....	1	0	2	...	...	...	...
Hoosick Falls	5,671	5	....	0	0	1	...	...	...	...
RENSSELAER	*10,000	10	....	2	0	1	...	1	...	...
Coxsackie	4,102	1	....	0	0	0	...	...	...	...
Catskill	5,486	7	....	0	1	3	...	...	...	...
HUDSON	9,528	13	....	0	0	4	...	1	...	...
KINGSTON	24,535	38	18.2	2	7	7	1	...	...	...
Ellenville	3,000	6	....	0	0	5	...	...	...	...
Marbletown	3,511	1	....	0	0	1	...	...	...	...
Rosendale	6,278	2	....	0	1	0	1	...	...	...
Esopus	4,907	4	....	0	1	1	...	...	...	...
Saugerties	3,700	3	....	1	0	2	...	...	...	...
POUGHKEEPSIE	24,029	46	22.5	6	3	9	...	...	...	...
Fishkill	13,016	14	....	1	2	3	...	...	...	...
Wappingers Falls	3,504	7	....	1	0	2	...	...	...	...
NEWBURGH	25,000	47	22.0	7	1	8	1	2	...	...
Port Jervis	9,385	16	....	1	1	5	1	...	...	...
MIDDLETOWN	14,522	17	....	1	2	7	...	...	...	...
Warwick	6,403	7	....	1	0	1	...	...	...	...
Goshen	4,564	13	....	1	0	6	...	...	...	...

* The population of Rensselaer was increased in 1902 by the addition of Bath-on-the-Hudson to 10,000.

DEPARTMENT OF HEALTH—VOLUME XX.

***districts, cities, villages and towns in the State of New York ember,* 1904.**

in Roman type. Population estimated to date printed in full face figures.]

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
65	32	33	16	200	139	735	1,184	203	51	326	604	696	606	251	332	88	319	761
64	31	33	14	191	129	680	1,138	185	47	284	570	642	531	231	311	61	295	728
21	11	26	10	106	99	333	625	91	27	138	279	361	279	131	178	22	183	437
10	6	1	1	18	4	92	85	9	4	12	46	37	39	17	19	4	20	28
28	14	6	3	57	25	226	369	63	15	101	215	195	176	65	83	27	79	241
11	...	...	...	8	...	22	32	20	1	30	21	36	30	7	25	5	10	7
4	...	...	...	2	1	7	27	2	...	3	9	13	7	11	6	3	3	15
...	...	...	...	...	...	...	...	...	...	1	...	3	...	...	...	3	1	1
...	...	...	...	...	...	3	2	1	1	3	2	2	6	2	2	1	3	4
...	...	...	...	...	1	5	3	...	...	2	...	2	4	2	1	...	1	1
...	...	...	1	...	...	...	...	...	...	1	...	2	2	1	...	1	...	...
...	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...
...	...	...	...	...	...	1	1	...	...	2	3	1	...	...	...	3	1	1
...	...	...	...	...	...	1	...	...	...	...	2	3	5	...	3	4	...	3
...	...	...	...	2	4	13	10	1	...	12	7	4	15	2	5	2	4	2
...	...	...	...	...	...	3	1	1	...	2	3	2	3	...	1	1	1	1
...	...	...	...	1	...	...	3	4	...	1	2	3	5	...	1	2	2	5
...	...	...	...	1	...	...	...	...	...	1	...	1	1	...	...	...	3	...
...	...	...	...	...	...	1	...	1	...	1	...	3	1	...	...	...	2	1
...	...	...	1	...	...	1	3	1	1	2	...	2	4	1	...	1	...	4
...	...	...	...	...	...	1	6	1	...	...	1	1	2	...	2	1	...	1
...	...	...	...	...	...	3	2	2	...	...	2	1	1	1	...	...	...	...
1	1	...	...	5	5	22	15	6	2	14	11	24	26	11	6	8	6	9
4	11	6	7	26	4	120	113	64	7	58	75	119	160	46	46	60	34	78
3	...	2	...	2	2	20	21	8	1	8	11	17	21	11	5	4	11	4
...	...	...	1	2	...	5	1	5	1	3	1	1	2	2	1	...	1	4
1	10	...	1	4	...	22	24	14	...	7	12	18	15	8	6	5	6	12
...	...	1	...	...	...	3	3	2	...	3	...	3	3	1	...	...	...	...
...	...	...	...	...	...	1	1	1	...	1	3	...	1	1	...	1	...	...
...	...	...	...	...	...	...	...	1	...	...	...	1	2	...	...	...	1	...
...	...	...	...	...	...	...	3	2	...	...	2	...	1	...	1	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...
...	...	...	...	...	...	1	...	1	...	...	2	1	...	...	1	1	...	...
...	...	...	...	1	...	1	1	...	...	2	...	...	5	...	...	1	...	1
...	...	...	3	2	...	8	1	2	...	1	2	3	8	4	1	2	...	...
...	...	...	...	...	...	...	1	...	...	1	...	2	2	...	...	...	...	...
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...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...
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...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	1
...	...	1	...	1	...	5	4	4	...	4	4	5	6	2	2	1	2	5
...	...	...	...	...	...	3	2	1	1	1	...	...	1	1	2	1	...	1
...	...	...	...	...	...	1	...	...	...	2	...	2	...	1	...	...	...	1
...	...	...	...	1	...	6	8	1	...	2	...	4	6	1	5	4	...	6
...	...	...	...	2	...	3	...	...	...	1	1	1	...	...	...	2	1	4
...	...	...	...	...	...	3	1	3	...	...	1	2	3	2	...	1	...	1
...	...	...	...	...	...	1	...	...	1	...	3	...	...	...	1	...	...	1
...	...	1	...	...	...	1	1	1	...	1	...	...	2	...	...	4	...	2

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Death at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
HUDSON VALLEY DISTRICT—(*Con.*)										
Montgomery	5,939	9	....	3	2	2	1	...	...	...
Haverstraw	9,874	12	....	3	3	1	...	...	...	...
Nyack	4,275	9	....	1	1	3	...	1	...	...
Ramapo	7,502	21	....	6	2	5	...	...	...	...
Rest of District	271,800	369	17.0	33	12	140	...	3	1	...
ADIRONDACK AND NORTHERN DISTRICT Totals	395,000	470	14.0	68	23	152	2	3	...	...
WATERTOWN	21,700	28	15.2	8	1	7	...	...	...	...
Ellisburg	3,888	8	....	0	0	6	...	...	...	...
Cape Vincent	2,882	3	....	1	0	0	...	...	...	...
Clayton	4,313	4	....	1	0	1	...	...	...	...
OGDENSBURG	12,633	10	....	1	1	3	...	1	...	...
Gouverneur	6,000	6	....	1	0	2	1	1	...	...
Potsdam	3,843	4	....	2	0	2	...	...	...	...
Canton	6,387	6	....	2	0	3	...	...	...	...
Malone	5,935	14	....	0	1	3	...	...	...	...
PLATTSBURG	8,434	13	....	2	0	4	...	...	...	...
Glens Falls	12,613	17	....	2	0	5	...	...	...	...
Whitehall	4,377	7	....	1	1	2	...	...	...	...
Fort Edward	5,216	8	....	0	0	2	...	...	...	...
Sandy Hill	4,473	6	....	2	1	2	...	...	...	...
Granville	5,217	9	....	0	0	2	...	...	...	...
Greenwich	4,172	4	....	0	0	3	...	...	...	...
Lowville	3,746	8	....	2	1	3	...	...	...	...
Rest of District	279,000	315	13.6	44	17	102	1	1	...	...
MOHAWK VALLEY DISTRICT Totals	428,400	542	15.7	71	21	173	3	7	...	...
SCHENECTADY	56,000	60	12.6	17	2	12	2	...	...	...
Cobleskill	3,973	4	....	0	0	1	...	...	...	...
AMSTERDAM	20,929	24	13.5	1	3	4	...	...	...	...
Fort Plain	2,444	3	....	0	0	1	...	...	...	...
JOHNSTOWN	10,130	20	....	2	1	5	...	...	...	...
GLOVERSVILLE	18,349	15	....	3	0	4	...	...	...	...
LITTLE FALLS	10,381	14	....	0	1	5	...	1	...	...
Herkimer	5,555	7	....	1	1	2	...	...	...	...
Ilion	5,138	1	....	1	0	0	...	...	...	...
UTICA	56,383	101	20.5	12	7	26	...	...	...	...
Whitestown	6,235	4	....	1	1	1	...	...	...	...
ROME	15,343	18	....	1	0	4	...	1	...	...
Boonville	3,332	5	....	0	0	3	...	...	...	...
Camden	3,745	8	....	0	0	3	...	...	...	...
Waterford	6,157	8	....	2	0	1	...	...	...	...
Mechanicville	4,695	12	....	5	0	2	...	...	...	...
Ballston Spa	3,923	4	....	1	0	2	...	...	...	...
Saratoga Springs	12,409	20	....	3	0	6	...	...	...	...
Rest of District	183,250	214	14.0	21	5	91	1	5	...	...
SOUTHERN TIER DISTRICT Totals	433,000	502	14.0	52	9	168	...	6	2	...
BINGHAMTON	40,000	65	19.0	8	2	19	...	1	...	...
Owego	5,039	6	....	1	0	2	...	...	...	...
Candor	3,330	2	....	0	0	0	...	...	...	...
Waverly	4,500	10	....	2	0	2	...	...	...	...
ELMIRA	35,672	43	14.2	3	2	14	...	2	...	...

FOR DECEMBER—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	...	...	.....	1	.....	1	...	1	.....	1	1	...	...	...	.....	3
....	...	...	...	1	.....	1	1	.....	...	1	1	.....	.....	...	1	...	.....	6
....	...	...	...	1	.....	.....	2	.....	...	.....	1	1	.....	2	...	...	.....	1
....	...	...	1	...	.....	4	2	2	...	.....	1	2	2	...	2	1	1	3
....	1	1	1	9	2	30	35	14	3	18	30	54	75	10	18	32	11	21
6	2	...	2	10	6	47	42	21	5	26	23	58	67	16	20	46	16	52
....	...	...	...	2	.....	.....	5	2	...	1	1	4	1	2	1	1	1	7
....	...	...	...	...	.....	3	.....	.....	...	.....	1	1	1	...	...	...	2	.....
....	...	...	...	...	1	.....	.....	.....	...	.....	.....	.....	1	...	...	...	1	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	1	1	...	...	1	1
....	...	...	...	1	.....	.....	2	1	...	.....	2	2	.....	1	...	...	.....	.....
....	...	...	...	...	.....	2	.....	.....	...	.....	.....	.....	1	...	...	...	.....	1
....	...	...	...	...	.....	.....	.....	1	...	.....	.....	.....	2	1	...	...	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	2	.....	...	...	...	1	3
....	...	...	...	...	.....	2	1	1	...	4	1	2	.....	1	...	1	1	.....
....	...	...	...	...	1	2	2	.....	1	.....	.....	2	.....	...	...	1	.....	4
1	...	...	...	...	.....	2	2	.....	...	.....	1	3	4	1	...	...	.....	3
....	...	...	...	...	.....	.....	2	.....	...	.....	.....	.....	2	...	2	1	.....	.....
....	...	...	...	...	.....	1	1	.....	...	.....	.....	2	3	...	...	...	1	.....
....	...	...	...	...	.....	.....	2	.....	...	.....	.....	1	2	...	...	...	.....	1
....	...	...	...	...	.....	1	2	1	...	1	.....	.....	1	2	...	1	.....	.....
....	...	...	...	...	.....	.....	2	.....	...	.....	.....	.....	2	...	...	...	.....	.....
....	...	...	...	...	.....	1	2	1	...	.....	.....	.....	.....	...	...	2	1	1
5	2	...	2	7	4	33	19	14	4	20	17	39	46	7	17	39	7	31
11	1	2	1	13	3	54	39	28	2	36	39	66	83	21	26	49	16	42
....	...	...	1	3	1	3	5	2	1	5	4	4	8	3	9	3	2	4
....	...	...	...	...	.....	1	.....	1	...	.....	1	.....	1	...	...	...	.....	.....
....	...	...	...	...	.....	4	.....	.....	...	1	3	6	7	...	...	1	1	1
....	...	...	...	...	.....	.....	.....	.....	...	.....	1	.....	1	...	...	1	.....	.....
1	...	...	...	...	.....	4	.....	2	...	.....	1	1	5	2	...	2	.....	2
....	1	...	...	...	.....	3	5	.....	...	1	1	1	1	...	...	1	1	.....
....	...	...	...	1	.....	4	1	.....	...	1	.....	3	1	...	...	2	.....	.....
....	...	...	...	...	.....	.....	.....	.....	...	2	.....	1	2	...	...	1	.....	1
....	...	...	...	...	.....	.....	.....	.....	...	.....	.....	.....	.....	...	...	...	.....	1
5	...	2	...	6	.....	9	6	3	...	6	6	10	16	3	8	7	4	10
....	...	...	...	...	.....	.....	.....	1	...	.....	.....	.....	1	...	...	1	.....	1
....	...	...	...	...	.....	5	2	1	...	1	.....	3	1	...	...	1	1	2
....	...	...	...	...	.....	1	1	1	...	.....	.....	.....	2	...	...	...	.....	.....
1	...	...	...	...	.....	1	1	.....	...	1	1	1	.....	1	...	1	.....	.....
1	...	...	...	...	.....	.....	1	1	...	.....	.....	1	.....	...	1	1	1	1
....	...	...	...	...	.....	.....	.....	5	...	2	.....	3	.....	...	...	...	.....	2
....	...	...	...	...	.....	.....	.....	.....	1	.....	.....	.....	1	...	...	2	.....	.....
....	...	...	...	...	.....	1	.....	.....	...	3	5	2	2	2	...	1	1	3
3	...	...	...	3	2	18	17	11	...	13	16	30	34	10	8	24	5	14
1	...	...	1	9	3	31	33	17	5	40	48	74	70	18	33	40	24	47
....	...	...	1	3	1	4	7	.....	...	8	9	6	7	1	4	7	1	5
....	...	...	...	...	.....	2	.....	.....	...	.....	.....	.....	1	...	...	1	1	1
....	...	...	...	...	.....	.....	.....	.....	...	.....	1	.....	.....	1	...	...	.....	.....
....	...	...	...	...	1	2	1	.....	...	1	1	.....	2	1	1	...	.....	.....
....	...	...	...	3	.....	2	4	2	...	3	3	7	3	4	2	2	3	3

							EPIDEMIC			
SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Deaths at 70 years and over.	Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
SOUTHERN TIER DISTRICT—(*Con.*)										
Horseheads	5,000	3	....	0	0	0	...	...	...	...
HORNELLSVILLE	12,000	17	....	0	1	6	...	...	...	...
Bath	5,000	9	....	0	0	1	...	...	...	...
CORNING	11,061	15	....	0	0	6	...	1	...	...
Wellsville	5,000	8	....	0	0	3	...	...	1	...
OLEAN	9,462	18	....	2	0	3	...	...	...	...
Salamanca	4,251	14	....	2	0	3	...	...	...	...
DUNKIRK	15,000	24	....	3	1	6	...	...	...	...
JAMESTOWN	22,892	21	12.0	2	0	2	...	...	...	...
Westfield	2,430	2	....	0	0	0	...	...	...	...
Fredonia	4,125	7	....	0	0	3	...	...	...	...
Rest of District	248,600	238	12.0	29	3	99	...	2	1	...
EAST CENTRAL DISTRICT Totals	404,500	514	15.5	36	18	172	2	9	...	...
SYRACUSE	110,000	115	13.5	9	2	32	...	2	...	...
Baldwinsville	3,000	2	....	0	0	0	...	...	...	...
DeWitt	5,435	3	....	1	0	0	...	...	...	...
CORTLAND	9,014	15	....	2	0	4	...	...	...	...
Homer	2,381	5	....	0	0	1	...	...	...	...
ONEIDA	7,942	9	....	0	0	5	...	...	...	...
Hamilton	3,744	7	....	......	1	5	...	...	...	...
Cazenovia	3,830	9	....	0	0	4	...	1	...	...
Canastota	3,300	3	....	0	0	1	...	...	...	...
Norwich	5,766	8	....	0	0	4	...	...	...	...
Oneonta	7,147	17	....	3	0	1	...	1	...	...
Worcester	2,409	[illegible]	....	0	1	1	...	...	...	...
Cooperstown	2,368	2	....	0	0	0	...	...	...	...
Walton	4,869	9	....	0	0	3	...	...	...	...
Delhi	3,243	2	...	0	0	1	...	...	...	...
Liberty	4,568	11	....	[illegible]	1	0	...	...	...	...
Rest of District	225,540	291	15.7	[illegible]1	13	110	2	5	...	...
WEST CENTRAL DISTRICT Totals	320,600	395	15	34	11	146	...	1	...	...
AUBURN	35,000	4	[illegible]	4	3	15	...	...	...	...
ITHACA	13,136	20	..	1	0	8	...	...	...	...
Hector	4,137	7	...	1	0	2	...	...	...	...
Waterloo	4,256	5	....	0	1	1	...	...	...	...
Seneca Falls	6,519	3	....	0	0	3	...	...	...	...
GENEVA	10,433	11	....	1	0	3	...	...	...	...
Canandaigua	6,151	15	....	2	0	1	...	...	...	...
Manchester	4,733	3	....	0	0	1	...	...	...	...
Phelps	4,788	10	....	0	1	3	...	...	...	...
Penn Yan	4,650	5	....	0	0	3	...	...	...	...
Batavia	9,180	8	....	1	0	1	...	...	...	...
Dansville	3,633	4	....	0	0	1	...	...	...	...
Le Roy	3,144	5	....	1	1	2	...	...	...	...
Warsaw	4,341	3	....	0	0	1	...	...	...	...
Rest of District	206,500	249	15.[illegible]	23	1	101	...	1	...	...
LAKE ONTARIO AND WESTERN DISTRICT Totals	915,200	1,165	15.[illegible]	164	92	276	6	25	...	...
BUFFALO	380,000	502	15.[illegible]	78	59	72	3	8	...	...
TONAWANDA	7,421	13	....	2	3	2	...	...	...	...
Amherst	4,223	3	....	1	0	1	...	...	...	...
NORTH TONAWANDA	9,069	7	....	3	0	2	...	...	...	...
LOCKPORT	16,581	27	....	4	2	6	...	1	...	...

for December—(*Continued*).

Diseases.						Other Causes of Death.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	...	...	...	...	.....	1	.....	......	...	......	.....	.....	.....	1	...	1	.....	......
....	...	...	...	...	.....	1	1	1	...	1	1	3	2	3	...	3	1	......
....	...	...	...	...	.....	.....	.....	1	...	1	2	.....	2	...	1	1	.....	1
....	...	...	...	2	.....	2	2	......	...	......	.....	1	3	1	2	...	1	......
....	...	...	...	...	.....	2	.....	......	...	......	.....	1	1	...	1	1	1	......
....	...	...	...	...	.....	1	1	3	...	2	2	3	1	...	1	1	.....	3
....	...	...	...	...	.....	1	.....	......	...	1	.....	3	3	...	3	...	.....	3
....	...	...	...	...	.....	.....	5	1	...	2	.....	2	2	1	3	4	.....	4
....	...	...	...	...	.....	4	.....	1	1	1	4	2	5	...	...	...	1	2
....	...	...	...	...	.....	1	.....	......	...	......	1	.....	.....	...	...	...	.....	......
....	...	...	...	...	.....	.....	.....	......	...	......	.....	2	2	...	...	2	1	......
1	...	...	...	1	1	8	12	8	4	20	24	44	36	5	15	17	14	25
6	1	1	...	5	4	41	41	22	3	37	29	93	65	32	30	39	23	31
3	...	...	...	1	.....	12	4	5	1	6	6	28	11	6	6	12	4	8
....	...	...	...	...	.....	.....	.....	......	...	......	.....	1	.....	...	...	...	1	......
....	...	...	...	...	.....	.....	.....	......	...	1	.....	.....	.....	...	...	...	1	1
....	...	...	...	...	.....	1	.....	......	...	......	2	2	2	3	1	1	1	2
....	...	...	...	...	.....	.....	.....	1	...	......	.....	.....	1	1	...	...	2	......
....	...	...	...	...	.....	.....	1	......	...	4	.....	1	3	...	...	...	.....	......
....	...	...	...	...	.....	.....	.....	1	...	......	.....	2	2	...	...	1	1	......
....	...	...	...	...	.....	.....	1	2	1	1	.....	2	1	...	...	...	.....	......
....	...	...	...	...	.....	.....	.....	......	...	......	.....	.....	1	...	...	1	1	......
....	...	...	...	...	.....	1	1	......	...	......	1	1	2	1	...	...	1	......
....	...	...	...	1	.....	1	.....	3	...	1	1	1	1	1	4	...	1	1
....	...	...	...	...	.....	.....	.....	1	...	......	1	1	.....	...	3	...	.....	......
....	...	...	...	...	.....	.....	.....	......	...	1	.....	1	.....	...	...	...	.....	......
....	...	...	...	...	.....	1	2	......	...	......	.....	1	2	1	1	1	.....	......
....	...	...	...	...	.....	.....	.....	......	...	1	.....	1	.....	...	...	...	.....	......
....	...	...	...	...	.....	6	.....	......	...	......	2	1	.....	1	...	...	1	......
3	1	1	...	3	4	19	32	9	1	22	16	50	39	18	15	23	9	19
....	1	...	...	5	1	19	31	9	1	36	32	71	52	21	32	30	17	36
....	...	...	...	1	.....	2	4	2	...	5	1	9	6	2	6	1	3	5
....	...	...	...	...	.....	1	1	......	...	4	5	1	4	...	3	...	1	......
....	...	...	...	...	.....	2	.....	......	...	3	.....	1	1	...	...	...	.....	......
....	...	...	...	...	.....	.....	.....	......	...	......	1	2	1	...	...	...	.....	1
....	...	...	...	...	.....	.....	.....	......	...	......	1	.....	1	...	...	1	.....	......
....	...	...	...	1	.....	1	2	1	...	......	.....	2	.....	1	1	1	.....	1
....	...	...	...	...	.....	1	.....	2	...	1	.....	2	1	1	4	1	.....	2
....	...	...	...	...	.....	.....	.....	......	...	1	1	1	.....	...	...	...	.....	......
....	...	...	...	...	.....	2	1	......	...	2	.....	.....	2	1	...	...	1	1
....	...	...	...	...	.....	.....	1	......	...	......	.....	.....	.....	1	2	1	.....	......
....	...	...	...	...	.....	.....	.....	......	...	1	1	.....	1	...	2	...	1	2
....	...	...	...	...	.....	.....	.....	......	...	......	1	1	2	...	...	...	.....	......
....	...	...	...	...	.....	.....	.....	......	...	......	2	1	.....	1	...	...	.....	1
....	...	...	...	...	.....	.....	.....	......	...	......	.....	.....	1	1	...	...	1	......
....	1	...	...	3	1	10	22	4	1	19	19	51	32	13	14	25	10	23
....	17	4	1	32	17	97	96	68	10	76	82	150	155	57	61	67	49	95
....	12	2	1	16	12	39	45	43	2	23	36	61	67	20	29	21	26	36
....	2	...	...	...	.....	2	1	1	...	......	.....	1	1	2	...	2	.....	1
....	...	...	...	...	.....	1	.....	......	...	......	.....	.....	1	...	...	1	.....	......
....	...	...	...	...	.....	.....	2	......	...	2	.....	.....	2	1	...	...	.....	......
....	...	...	...	3	1	6	.....	1	...	1	1	5	3	...	2	1	.....	2

SANITARY DISTRICTS.	Population.	Total number of deaths.	Representing annual death rate per 1,000 population of—	Deaths under 1 year of age.	Deaths 1 to 5 years of age.	Death at 70 years and over.	EPIDEMIC Cerebrospinal meningitis.	Typhoid fever.	Malarial diseases.	Smallpox.
LAKE ONTARIO AND WESTERN DISTRICT—(*Con.*)										
NIAGARA FALLS	25,000	41	15.3	7	6	4	...	6	...	...
Medina	4,716	9	....	1	0	4	...	...	...	...
Albion	4,477	6	....	0	0	3	...	...	...	...
Brockport	3,400	9	....	0	0	3	...	3	...	...
ROCHESTER	165,000	198	14.0	14	10	52	...	1	...	...
Palmyra	3,758	5	....	0	0	3	...	...	...	...
Newark	4,578	3	....	0	1	0	...	1	...	...
Lyons	5,824	4	....	1	0	2	...	...	...	...
Clyde	2,507	4	....	0	0	1	...	...	...	...
OSWEGO	22,200	32	17.0	3	1	12	1	...	...	...
FULTON	8,734	15	....	2	0	4	...	3	...	...
Richland	3,535	5	....	0	0	2	...	...	...	...
Rest of District	244,184	282	14.1	48	10	103	2	2	...	...
Totals for the State	7,746,000	11,463	17.5	1,646	941	2,235	113	136	13	...
Average for past five years	....	10,303	16.7	......	*2,357	1,996	35	182	14	14

* All deaths under 5 years of age.

FOR DECEMBER—(*Concluded*).

DISEASES.						OTHER CAUSES OF DEATH.												
Scarlet fever.	Measles.	Erysipelas.	Whooping cough.	Croup and diphtheria.	Diarrheal diseases (under 5 years).	Consumption (pulmonary).	Pneumonia.	Acute respiratory diseases (other than pneumonia).	Puerperal diseases.	Diseases of digestive system (not diarrheal, under 5 years).	Diseases of urinary system.	Diseases of circulatory system.	Diseases of nervous system.	Cancer.	Accidents and violence.	Old age.	General diseases, not epidemic (except consumption and cancer).	Unclassified.
....	2	...	...	...	2	1	5	2	1	3	4	2	4	1	2	...	2	4
....	...	...	...	...	.....	1	.....	......	1	1	1	1	.....	1	1	1	.....	1
....	...	...	...	...	.....	.....	.....	......	...	.....	.....	1	.....	2	2	1	.....	......
....	...	1	...	...	.....	1	.....	......	...	.....	.....	2	.....	...	...	1	1	......
....	...	1	...	8	.....	20	15	7	4	20	18	23	27	10	4	15	9	16
....	...	...	...	...	.....	1	.....	......	...	.....	.....	.....	1	1	...	2	.....	......
....	...	...	...	...	.....	.....	.....	......	...	.....	.....	.....	1	...	...	...	1	......
....	...	...	...	...	.....	1	.....	......	...	1	.....	.....	2	...	...	...	.....	......
....	...	...	...	...	.....	.....	1	......	...	1	1	.....	.....	...	...	1	.....	......
....	...	...	...	1	.....	5	3	......	...	.....	1	9	6	1	2	1	.....	2
....	...	...	...	...	.....	.....	1	......	...	.....	3	1	2	2	1	1	.....	1
....	...	...	...	...	.....	.....	.....	......	...	2	.....	1	2	...	...	...	.....	......
....	1	...	...	4	2	19	23	14	2	22	17	43	36	16	18	19	10	32
93	65	46	28	300	177	1,144	1,579	432	84	635	932	1,327	1,258	462	580	419	498	1,142
79	77	32	55	333	191	1,079	.....	†1,796	84	628	842	1,080	1,134	442	512	442	.....	‡1,254

† Includes all acute respiratory diseases. ‡ Includes the preceding column.

ANTITOXIN LABORATORY

REPORT.

ANTITOXIN LABORATORY.

February 1, 1905.

DANIEL LEWIS, M. D., *Commissioner of Health, New York State Department of Health.*

Dear Sir—I have the honor to herewith report upon the work carried on in the Antitoxin Laboratory during the year nineteen hundred and four.

Until the present time the strictly laboratory work has been conducted in the Bender Hygienic Laboratory. The main branches of the work of the latter have increased to such an extent that its trustees deemed it wise to request the Antitoxin Laboratory to obtain other quarters at its earliest convenience. In accordance with this request the frame dwelling adjoining the stable of the Antitoxin Laboratory on Yates street, Albany, which was purchased in accordance with a provision of chapter 729 of the laws of 1903, is being fitted up for the antitoxin work now carried on in the Bender Laboratory. This arrangement cannot be considered as providing for the permanent quarters of the laboratory, as the buildings are of a temporary character not at all suited nor economical for the conduct of work of this kind.

The plan mentioned in previous reports for the general conduct of the work has been adhered to in that the major portion of the laboratory's efforts have been directed toward the practical work in connection with the production and distribution of diphtheria and tetanus antitoxins. However efforts and work along the lines of an antidysenteric and antistreptococcic serum were made and will be referred to later.

Diphtheria antitoxin is now regularly supplied to all but one of the 43 cities of the State, and to the inhabitants of 617 villages and towns, or on an average of over 11 localities in each

of the 57 counties of the State outside of those comprising New York city.

The following table shows the increase in the number of places to which supplies are regularly sent:

TABLE I.

	1902.	1903.	1904.
Cities supplied	30	42*	42
Villages supplied	161	204	617
Towns supplied	171	280	
Total	362	526	659

Average number of places per county 11.

It is not likely that the number of health officers in the State who will need to keep supplies of antitoxins on hand will greatly increase, as the very large majority of those representing communities of a size likely to become the seat of any number of cases of diphtheria already keep supplies on hand. Many of the smaller localities are able to obtain what they may need in a few hours, at the latest, from the health officers of larger communities near by.

The total output of diphtheria antitoxin calculated on the basis of fifteen hundred units per bottle was 16,374 bottles, an increase of about 25 per cent. over the output of 1903, as is seen by reference to the following table:

TABLE II.

Nine months of year 1902	6,552 bottles.
Nine months of year 1903	14,121 bottles.
Nine months of year 1904	16,374 bottles.

TABLE III.

SHOWING POTENCY OF SERUM ISSUED.

1902	300 antitoxic units per cubic centimetre.
1903	325 antitoxic units per cubic centimetre.
1904	375 antitoxic units per cubic centimetre.

This increase in the output would have been greater but for the fact that no large epidemics of diphtheria occurred in any of the State institutions, as was the case in 1903. This gratifying

*Through an error this figure was given as 43 in the 1903 report.

and satisfactory freedom fr̂om distressing and expensive visitations of this disease is undoubtedly due, to a considerable extent at least, to the continued and vigorously persistent injection of immunizing doses of diphtheria antitoxin, supplied by this laboratory, into such well persons in these institutions as have come in contact with such few cases of diphtheria as occasionally occur in them. The prompt use of antitoxin in this way will invariably prevent the occurrence of an epidemic, and will keep down the number of cases to a minimum. Considering the great expense entailed through the occurrence of an epidemic of diphtheria in a large State institution, the prevention of such can only be looked upon in the light of a most important and economical work; although no State institution suffered from a large epidemic of diphtheria there was distributed to them the equivalent of 1,351 bottles each of 1,500 units. By far the larger portion of this serum was used in these institutions for immunizing purposes. Thus in the Utica State Hospital, 1,019 immunizing doses were injected into nurses and inmates who had been exposed to cases of the disease. There were eleven cases of diphtheria in the hospital, and of these three had received immunizing doses of antitoxin 27, 13 and seven days respectively before the onset of the attacks. Thus, out of more than a thousand persons receiving protective doses, but three developed the disease within the period of four weeks, which is the usual duration of protection resulting from one protective injection.

As has been pointed out in past reports it is very difficult to obtain complete reports from all the cases in which the Department's antitoxin is used. This cannot be avoided except at a considerable outlay for clerical services, or at considerable inconvenience in the distribution. Even under the best of conditions many reports would not be obtained on account of accidental conditions which could be avoided, such as transfers of patients from one physician to another, or to hospitals, deaths and removals of physicians and other like conditions.

However, the reports received are undoubtedly a fair index of the results obtained in all the cases, and the uniformity of the results obtained from year to year, as shown by the tables below, indicates the probable accuracy of applying the results in a few cases as an index of the total.

In all, reports have been received from physicians treating 3,239 persons with the diphtheria antitoxin supplied by this laboratory. Of these 1,417 persons were ill with true diphtheria, or an infection strongly suspected of being diphtheria, and the treatment was directed toward the cure of the disease. The other 1,822 persons were not ill but received injections of immunizing doses as a means of protection.

The number of reports of persons immunized is less than usual, owing to the fact that no epidemics of diphtheria have occurred in any of the State hospitals or other institutions, as was the case during past years. However, the use of antitoxin for this purpose has increased generally and this will undoubtedly continue.

Of the 1,417 persons treated as sick the reports of physicians were incomplete as to the termination of the cases in 35, and all efforts to obtain the full amount of information desired were futile.

Seven additional persons treated did not have diphtheria, but antitoxin was administered in the hope of its accomplishing some good.

We have to consider, therefore, 1,375 sick persons treated with antitoxin because of what appeared, at least at first, to be diphtheria. However, if we eliminate from this number all the cases reported as not diphtheria by both the bacteriological and clinical diagnoses, nine in number, and all those not diphtheria

TABLE IV.

COMPARING BACTERIOLOGICAL AND CLINICAL DIAGNOSES.

A.

Clinical Diagnosis

BACTERIOLOGICAL DIAGNOSIS	Number of cases	Positive	Negative	Not given	Deaths	Fatality
						Per cent.
Positive	429	402	6	21	31	7.4
Negative	37	23	9	5	2	5.6
Not given or doubtful	909	816	5	88	83	9.1
Totals	1,375	1,241	20	114	116	8.4

B.

Bacteriological Diagnosis.

CLINICAL DIAGNOSIS	Number of cases	Positive	Negative	Not given	Deaths	Fatality
						Per cent.
Positive	1,241	402	23	816	113	9.1
Negative	20	6	9	5	1	5.0
Not given or doubtful	114	21	5	88	2	1.7
Totals	1,375	429	37	909	116	8.4

bacteriologically with the clinical diagnosis not given, five in number, and those without a bacteriological diagnosis and a negative clinical diagnosis, also five in number, in none of which groups were there deaths, we have remaining 1,356 cases, of which 116 died, giving a fatality of 8.5 per cent.

If we still further eliminate the 88 cases with two deaths in which neither diagnosis was given, we have remaining 1,268 cases, all of which were diagnosed diphtheria either clinically or bacteriologically, or in both ways, and of these 114 died, giving a fatality of 8.9 per cent.

These fatality percentages show a remarkable similarity to those reported last year, and speak for their probable accuracy as representing the general results to be expected from larger numbers of cases.

As these fatalities do not vary over one-half of one per cent., the full number of 1,375 cases will be included in the tables showing other factors and results.

The influence which the time of the injection of the antitoxin has on the termination of the case is very strikingly shown in Table V, where the death rate for the cases injected on the first day is less than one per cent., and of those injected on the fourth day or over is from 16.6 per cent. to 21.7 per cent.

TABLE V.

	First	Second	Third	Fourth	Fifth	Sixth and over	Not stated	Totals
Cases	330	446	238	114	56	101	90	1,375
Deaths	3	21	26	19	9	22	16	116
Fatality, per cent	.9	4.7	10.9	16.6	16	21.7	17.7	8.4

These results are also in close harmony with those obtained last year in the same manner. A better demonstration of the value of giving antitoxin early in the course of the disease could hardly be obtained.

TABLE VI.

Showing Total Dosage for Each Case.

SIZE OF DOSES	Number of cases	Per cent. of cases	Deaths	Fatality
				Per cent.
Unknown	29	2.1	3	10.3
Up to and including 1,000 units	25	1.8	1	4.0
1,000 to 1,500 units	201	14.6	13	6.4
2,500 units	421	30.6	20	4.7
3,000 units	116	8.5	10	8.6
4,000 units	101	7.4	12	11.9
5,000 units	167	12.1	15	9.0
6,000 units	48	3.5	8	16.6
7,000 units	31	2.3	3	9.6
8,000 units	70	5.1	6	8.5
9,000 units	25	1.8	0	0.0
10,000 units	41	2.97	5	12.1
15,000 units	58	4.2	13	22.4
20,000 units	14	1.0	3	21.4
30,000 units	16	1.16	3	18.0
55,000 units	11	0.8	1	9.0
204,250 units	1	0.07	0	0.0
Totals	1,375	100.00	116	....

Table VI shows the total amounts of antitoxin administered in the 1,375 cases in which this factor could be worked out. As was pointed out last year it might seem, at the first glance, as if the cases receiving the largest amounts of antitoxin did not do as well as those receiving less. A closer analysis shows that the percentages are very irregular and that this is, to a certain extent, due to the small number of cases receiving these particular doses. Many other factors not evident in the table in question, but which are indicated in the other tables, require consideration in order to correctly estimate the value of properly large doses of antitoxin in severe cases.

It cannot be denied, however, that the most important factor in the treatment of a case of diphtheria is the early administration of the remedy. Those cases first seen late in the disease naturally require the most heroic treatment and doses.

It is of interest to note that fifty-two per cent. of the cases received 3,000 units or over, that thirty-seven per cent. received 5,000 units or over, and that ten per cent. received 10,000 units or over.

In Table VII will be found the number and size of individual doses administered to the cases in our series in which we are able to determine this factor.

TABLE VII.

Showing Relative Frequency of the Administration of Doses of Various Sizes.

SIZE OF DOSES	Number administered	PER CENT. OF WHOLE	
		1904	1903
Unknown	28	....	....
Up to and including 1,000 units	88	4.0	1.4
1,000 to 1,500 units	575	22.7	31.4
2,500 units	1,139	46.5	48.6
3,000 units	232	9.5	10.1
4,000 units	134	5.5	3.5
5,000 units	204	8.4	4.8
6,000 units	18	0.8	0.5
7,000 units	10	0.4	0.5
8,000 units	19	0.8	0.2
9,000 units	12	0.5	0.0
10,000 units and over	20	0.9	0.0
Totals	2,479	100.0	....

In accordance with the recommendations in the report of last year, the 2,500 unit package was changed to 3,000 units in November. The change is not seen in the last table, which indicates a continued preponderance in the use of the 2,500 package. There is, however, a considerable increase in the number of doses of over 3,000 units administered in 1904 over 1903. In 1904 the per cent. of such doses was 17.3 as against 9.5 for 1903, with the greatest increase in the number of 5,000 unit doses.

In demonstrating the 116 fatal cases the arrangement of tables adopted last year will not be followed, but the cases will be grouped into six classes on the same basis as was used last year as follows:

First, those cases moribund when first seen; second, those cases not receiving injections until the third day or later; third, those cases dying from heart failure during or after apparent convalescence; fourth, the cases in which a serious complication contributed to the fatal termination; fifth, the fatal cases in children under two years of age; sixth, the remaining cases in which sufficient accurate information for proper classification was not available.

In group one there are five cases moribund when first seen before the third day of the disease. Ten more cases were moribund when first seen, but it was on the third day or later, and these cases are placed in group two.

In group two are forty-four cases not injected until the third day of the disease or later. However twenty-three cases placed in group three or heart failure cases, five cases placed in group four on account of serious complicating diseases, and one case placed in group five consisting of infants were all injected on the third day or later. Thus sixty-three per cent. of all fatal cases were not injected until the third day or later.

In group three are thirty-one cases dying from the so-called "cardiac paralysis" when the acute and other manifestations of the disease, except paralysis, had disappeared. Where the day of injection was given in the reports of these thirty-one cases, in every instance but one it was the third day or later, and usually much later. In the exceptional case the injection was made on the second day, and in six instances the day was not stated. The closest possible connection between the tardy administration of antitoxin and these heart collapses during convalescence is here indicated.

In group four are twelve cases in which serious complications like scarlet fever, syphilis, bronchopneumonia, valvular heart disease, fractures and other like conditions contributed toward, and in many instances, were the direct causes of the fatal endings. Six cases included in group two also suffered from complications, but not to the extent that the twelve placed in this group did.

In group five are seven cases of the disease in children under two years of age, in which the disease generally ran a very rapid course regardless of treatment. Groups one and two each also contain two, and group three one case in infants.

Group six contains seventeen cases, in which the reports were so incomplete that they cannot be grouped in the above classes.

As has been stated reports of the use of immunizing doses of antitoxin on 1822 persons were received. Excluding the cases developing diphtheria within a few hours of the injection of the immunizing dose, eleven persons developed the disease within a period of four weeks from the time of the administration of

the immunizing dose. In only four of these cases was the attack proven to be diphtheria by a bacteriological diagnosis. Three cases occurred in one family, and as no bacteriological diagnosis was made it is quite possible that the disease developing was not diphtheria, and if it was true diphtheria then this family showed a rather remarkable susceptibility to the disease. Their attacks developed on the third day after injection in one instance, and on the sixth day in the others.

In the other eight cases the disease developed on the second, fourth, fifth, seventh, thirteenth, fourteenth, seventeenth and twenty-seventh days respectively. The latter case in an inmate of the Utica State Hospital for the Insane had received injections of immunizing doses on the twenty-seventh, sixty-first and ninety-fifth days prior to the final onset of the attack. None of the cases occurring after an immunizing injection were of a severe character, and all recovered promptly.

DISTRIBUTION OF TETANUS ANTITOXIN.

The interest in this branch of the laboratory's work showed a healthy development during the past year. During the year there were distributed through the health officers of all parts of the State 1,024 immunizing doses, and 554 packages each containing one therapeutic dose of fifty cubic centimetres. This gives a total equivalent of 3,794 bottles of ten cubic centimetres each.

Physicians and health officers clearly show their interest in this work in their communications to the Department. There were no evidences of any intention on their part to relax in their endeavors to prevent the disease in wounded persons, especially those injured through the celebration of the Fourth of July. Before that day notices were sent out by the health officers of all the large cities and published in the daily papers that the tetanus antitoxin supplied by this Department would be available for immunizing purposes. While but few actual reports of its use in this way are sent in to the Department, personal communications from the local health officers, and others, indicate a wide and successful use of this serum for the prevention of the disease.

Reports were received giving the results obtained from the injection of immunizing doses in seventy-five persons who had been injured in a manner which experience has shown is likely to result in tetanus infection. Of these, forty-three persons were injured through the careless celebration of the Fourth of July.

Reports were received from the physicians treating 20 cases of tetanus with the Department's antitoxin. As an extensive report on this subject was made in the last report, and has also been published as a scientific paper by the Director of the Laboratory,* the details of these cases will be reserved for summarization, with subsequent cases, in a later report.

It may be said, however, that the conclusions reached in the report of last year are supported by the results shown in this year's reports, namely, that while tetanus antitoxin may not be of great value in the treatment of the severely acute attacks of the disease, it may be of great service in the moderate and mild cases if administered early, and that, furthermore, it is an ideal preventive agent when used soon after the infliction of the injuries which commonly result in tetanus. No case of general tetanus developing after the administration of a proper preventive dose of antitoxin at the time of injury, has yet been reported in the literature.

DISTRIBUTION OF ANTIDYSENTERIC SERUM.

In continuation of the efforts of the laboratory along the line of the production and distribution of antidysenteric serum, the following notice was sent out in the early summer to the health officers of all the principal cities and villages of the State, and was also printed in the Department's Bulletin for June.

"The Antitoxin Laboratory is now in a position to supply health officers with a limited amount of antidysenteric serum for the use of the physicians who have cases of dysentery in adults or in children, or cases of summer diarrhœa in children, and who desire to test the efficiency of this treatment.

According to the present weight of evidence cases of diarrhœa characterized by the presence of considerable amounts of blood and mucus in the stools, and generally with severe prostration, are caused by infection with Bac. Dysenteriæ (Shiga), or allied bacilli. The fæces in these cases usually show the presence of

* Pease. Recent Advances in Our Knowledge of Tetanus Infections. Medical Review of Reviews, June, 1904.

this bacillus in large numbers to the almost complete exclusion of other bacteria.

In other forms of diarrhœa, especially when the stools contain considerable quantities of mucus, and possibly a small amount of blood, Bac. Dysenteriæ has been frequently found in the fæces, but usually after more or less prolonged search. It is open to question whether this microörganism is of any etiological significance in such cases.

If the antidysenteric serum is likely to be shown to be of therapeutic value it will certainly be demonstrated in its use on the first class of cases.

According to the present conceptions it should also act more efficiently as a preventive agent than for the treatment of these forms of disease. It should, therefore, be used as early as possible in the course of disease, or at once in suspected cases.

It should be injected subcutaneously in the same manner, and with the same precautions, as in the injection of diphtheria antitoxin.

Health officers should notify the Department if they desire to keep a supply of this serum on hand during the summer."

But few health officers made application for supplies of this serum and no reports of its use in cases have been received.

The results obtained by the use of antidysenteric serum in cases of acute dysentery in children and adults in this country have not been sufficiently encouraging to stimulate its general use. Moreover, considerable doubt has been cast upon the claims made that the Bacillus dysenteriæ, and other closely allied or "Paradysentery bacilli" are the sole cause of the summer diarrhœas of children.

Owing to this condition of affairs, and the expense of the work, it has been deemed best to discontinue the production of this serum.

ANTISTREPTOCOCCIC SERUM.

The work looking toward the production of an antistreptococcic serum for use in cases of primary and secondary infections with this class of organisms was continued under some difficulties. Two horses were utilized for the work, and the injections of specially prepared cultures of various streptococci were made into them.

In the meantime a review of the recent literature, giving reports on the use of the various antistreptococcic serums, prepared in

European laboratories, was undertaken. The conclusion reached, by the various authors, who published their results, were on the whole so conflicting as to render it impossible to arrive at any definite conclusion as to the value of such serums in the actual treatment of streptococcic infections.

Some of the more valuable reports were mentioned in a paper on Streptococci and Antistreptococcic Serum, presented by the director of the laboratory at the Fourth Annual Conference of Sanitary Officers, held late in the fall, and will be found in the published proceedings of the conference.

Later reports of other workers fail to confirm the earlier favorable results.

Further papers dealing with the recent development of the subject are in course of preparation, and will be published shortly.

SPECIAL WORK.

As was mentioned in the report for 1902, the director of the laboratory was a member of two important committees, appointed by two national bodies, to consider the subject of the standard diphtheria antitoxic unit and make recommendations concerning the same.

Both committees have continued active work upon the subject for the last two years, and have recently handed in their reports. This laboratory represented by its director took an especially active interest in, and devoted much time and energy to the work of both committees, and the results of the same should therefore appear in this report.

After deliberating for over two years, during which time many laboratory observations upon the appearance, character, and keeping qualities of diphtheria antitoxin were made, the special committee, appointed by the Committee on Revision of the Pharmacopœia of the United States, made the following report on May 2, 1904:

Prof. JOSEPH P. REMINGTON, *Chairman of the Committee of Revision of the Pharmacopoeia of the United States, Philadelphia, Pa.*

DEAR PROF. REMINGTON:—The special committee appointed by you to consider the proposition to introduce diphtheria antitoxin

into the next issue of the U. S. Pharmacopœia begs to make the following recommendations:

1. That diphtheria antitoxin should be introduced into the U. S. Pharmacopœia.

2. That descriptions of the following physical characteristics should be included

(a) Macroscopic appearance of fluid antitoxic horse serum.

(b) Specific gravity: The specific gravity of normal antitoxic horse serum taken at 25° C. should be within the following limits, 1.025–1.040.

(c) The odor of normal antitoxic horse serum is practically imperceptible. When an antiseptic has been used in its preparation the odor of the antiseptic may be present.

3. That each vial of diphtheria antitoxin should have upon the label attached to the bottle, or enclosed in the sealed package containing the bottle, the following data:

(a) The name and percentage by volume of any antiseptic used in the preparation of the antitoxin.

(b) The date on which the antitoxin was tested.

4. That a statement should be introduced to the effect that diphtheria antitoxin should be kept at a temperature ranging from 40° to 60° Fahr. in a dark place, and that when properly sealed and kept under these conditions decreases in antitoxin units very gradually. The decrease in one year has been found to vary between ten and thirty per cent.

5. That the average initial dose for the treatment of cases of diphtheria be 3,000 units. For the immunization of well persons 500 units.

6. That the strength of diphtheria antitoxin be expressed in terms of the unit established by Ehrlich.

Your very respectfully,

(Signed) THEOBALD SMITH, *Chairman.*
THOMAS C. CRAIG,
H. A. HARE,
E. M. HOUGHTON,
J. J. KINYOUN,
M. J. ROSENAU,
W. H. PARK,
H. D. PEASE, *Secretary.*

As a result of this report the following form for the presentation of the matter in the volume of the Pharmacopœia, about to be issued, has been drawn up by the chairman of the committee on revision.

SERUM ANTIDIPHTHERICUM.*

Antidiphtheric Serum—Diphtheria Antitoxin.

A fluid separated from the coagulated blood of a horse (Equus caballus Linne) immunized through the inoculation of diphtheric toxin. It should be kept in sealed glass containers, in a dark place, at temperatures between 4.5° and 15° C. (40° and 59° F.).

A yellowish or yellowish-brown, transparent or slightly turbid liquid, odorless or having a slight odor, due to the presence of the antiseptic used as a preservative.

Specific gravity: 1.025 to 1.040 at 25° C. (77° F.).

Antidiphtheric serum gradually loses its power, the loss in one year varying between 10 per cent. and 30 per cent. Each container should be furnished with a label or statement, giving the strength of the antidiphtheric serum, expressed in antitoxic units, the name and percentage by volume of the antiseptic used for the preservation of the liquid (if such be used), the date when the antidiphtheric serum was last tested, and the date beyond which it will not have the strength indicated on the label or statement.

The standard of strength, expressed in units of antitoxic power, should be that approved by the United States Public Health and Marine Hospital Service.

Average dose—3,000 units.

Immunizing dose for well persons—500 units.

The insertion of diphtheria antitoxin, including a statement of the character of tests for the determination of the antitoxic strength of this serum in the Pharmacopœia, will operate, in accordance with section 197, chapter 667, of the laws of 1900 of this State, known as the Pharmacy Law, to set the standard described in the Pharmacopœia as the legal standard for this State. In accordance with the statement in the Pharmacopœia, quoted above, on and after September 1, 1905, the diphtheria

*Eighth Decennial Edition of the Pharmacopoeia of the United States, 1905, page 393.

antitoxic unit, approved by the United States Public Health and Marine Hospital Service, becomes the official unit for this State.

The United States Public Health and Marine Hospital Service approved* the unit established by Prof. Ehrlich in 1896, and now issued by them in the form of a Standard Diphtheria Antitoxin.

The work of the other committee mentioned above, namely, the committee on antitoxic and immunizing sera of the laboratory section of the American Public Health Association, was in large part supplementary to the work just mentioned, and had for its object the formulation of rules to govern the conditions under which the official tests should be carried out.

The report of this committee, presented to the laboratory section at its annual meeting, held at Havana, Cuba, January 9, 1905, is as follows:

REPORT OF THE COMMITTEE ON ANTITOXIC AND IMMUNIZING SERA OF THE LABORATORY SECTION OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

As the laboratory section of the American Public Health Association stands for uniformity of method in all possible routine laboratory tests, it seemed desirable to your committee to take up and consider for its present field of work the application of this principle to the routine testing of antitoxins.

It was deemed wisest to first undertake work on the standardization of the method of testing diphtheria antitoxin, leaving those for tetanus antitoxin and other immune sera for such action as their future therapeutic standing would seem to warrant.

As the subject deals with reactions governed by laws which are at present imperfectly understood, and as the results of these reactions are made manifest only through the use of animals, thereby introducing many unknown factors, it is clearly evident to all that any standard test will be a purely arbitrary one, and that the results obtained by its use can be considered only to approximate accuracy and uniformity.

*M. J. Rosenau. The Immunity Unit for Standardizing Diphtheria Antitoxin. Bulletin Hygienic Laboratory, U. S. Pub. Health and Mar. Hos. Ser., 1905, No. 21.

It is not our intention to reconsider or discuss in detail the investigations of Behring, continued by Ehrlich and his followers in their extensive work, which resulted in the formulation of the so-called Ehrlich Standard Unit for diphtheria antitoxin. A brief review of the events leading up to it will suffice.

Prior to 1897 the test generally applied for the determination of the antitoxic strength of sera was based on the formula arbitrarily chosen by Behring to represent the unit for diphtheria antitoxin. This may be defined as follows: An antitoxic unit is ten times the amount of antitoxin required to leave intact a 250 gram guinea pig from the injection of 10 times the certainly fatal dose of the toxin,* for pigs of this weight. The method employed was to mix ten times the minimum fatal dose of a toxin toward a 250 gram guinea pig with different quantities of antitoxic serum, and to inject the same subcutaneously into guinea pigs of the required weight. That amount of serum which apparently neutralized the pathogenic action of this amount of toxin contained one-tenth of an antitoxic unit. In other words, 90† to 100 minimum fatal doses of the usual diphtheria toxin were expected to be neutralized by one unit of antitoxin.

Ehrlich in 1896 found that this was not always the case. By using various toxins, and the same toxin at different periods, he observed that a unit of a given serum did not neutralize the same number of fatal doses but that the latter varied within such wide limits as from 30 to 130 fatal doses. On the other hand he found that the power of a given toxin to combine with an antitoxin remained constant within narrow limits, and he was led to establish a standard antitoxin in place of a standard multiple of the minimum fatal dose of toxin. Such a standard antitoxin is prepared by him under such elaborate precautions as he believes will insure its permanency, and from time to time, at present every two months, portions of the same are sent out, dissolved in a mixture of glycerin and salt solution, for the purpose of enabling producers of antitoxin to standardize such toxins as they desire to use in testing the strength of antitoxic sera. One cubic centimetre of a given dilution of this standard serum represents, according to Ehrlich, one unit of diphtheria antitoxin.

*This was the ordinary fresh toxin produced in the Behring laboratory.
†Some fraction of the 10 fatal doses was neutralized by the guinea pig.

This standard unit of antitoxin has been adopted officially by the German government, and has been used as the standard by the official or prominent laboratories in France, Austria, Denmark and England, in Europe, and by the State laboratories in Massachusetts and New York, and the majority, at least, of the private producers of antitoxin in America. Your committee, therefore, will not enter into any discussion or consideration of either the theoretical or practical problems connected with the establishment of this unit, but will pass on to the discussion of the methods for testing the specific strength of diphtheria antitoxic sera by the use of this standard antitoxic unit or of the Standard Serum issued by the United States Public Health and Marine Hospital Service.

In a general way the procedures are as follows:

If we have at hand either of these standard sera it becomes necessary for the standardization of a toxin to add to that amount of a dilution of the standard serum which contains exactly one unit, such an excess of toxin that the resulting mixture will just prove fatal to a standard weight guinea pig on the third or fourth day after its subcutaneous injection. This point Ehrlich denominates L+. The amount of toxin needed to be neutralized completely by the antitoxin he designates L0. Both these terms are now commonly employed and are recommended to be used in designating these points. Having determined the L+ dose of a given toxin that amount of any antitoxic serum which when mixed with this dose will prevent the death of a standard weight guinea pig before the fourth day after injection contains one unit of antitoxin.

From time to time members of your committee have consulted concerning the methods used by each one in the application of both the tests for the determination of the L+ dose of toxins by the use of the Standard Serum and the estimation of the antitoxic strengths of sera therefrom. These consultations led to a certain slight degree of uniformity in the methods used, but it has frequently seemed desirable by several members to have the various methods discussed, and one, uniform at least along general lines, adopted as a standard.

One of the members of the committee having observed that the results of his test on a given toxin did not agree with those

of a co-worker on the same toxin, decided to ascertain how uniform the results obtained by different investigators in different laboratories, and under their varying environment, might be. To this end he requested samples of toxins from seven laboratories, which he tested with the following results:

TOXIN A.—L+ dose said by sender to be 0.32 c.c.
Tested for 0.33 guinea pig died in 27 days.
Tested for .34 guinea pig died in 27 days.
Tested for .35 guinea pig died in 27 days.
Tested for .42 guinea pig died in 6 days.
Tested for .43 guinea pig died in 4 days.
TOXIN B.—L+ dose said by sender to be 0.76 c.c.
Tested for 0.76 guinea pigs all died in 4 days.
TOXIN D.*—L+ dose said by sender to be 0.33 c.c.
Tested for 0.33 on a large number of guinea pigs at different periods and all died within four days.
TOXIN E.—Same as D. with same results.
TOXIN F.—L+ dose said by sender to be 0.19 c.c.
Tested for 0.19 guinea pigs died in 48 hours.
Tested for 0.185 guinea pigs died in 4 days.
Tested for 0.18 guinea pigs died in 4 days.

Subsequent to these tests it was deemed advisable for some one member to submit samples of an antitoxic serum to the other members for the purpose of obtaining the results of tests made by each member using the methods regularly employed for this work in his laboratory. These results are presented in the following tables. Each table represents some of the tests applied by one member. With but one exception the method of ascertaining the L+ dose of toxin by the use of the Ehrlich Standard Serum, and the testing the serum against that dose, was employed. In the other case the former method of Behring modified so that 90 minimum letal doses of a fresh toxin are neutralized by one unit of antitoxin was employed. The results in those tests were as follows:

TABLE I.

Behring's Test Modified.

Toxin 90 M.L.D. +1/300 c.c. Serum (300 units per c.c.)	Animal lived.
Toxin 90 M.L.D. +1/325 c.c. Serum (325 units per c.c.)	Animal died 4½ days.
Toxin 90 M.L.D. +1/350 c.c. Serum (350 units per c.c.)	Animal died 4 days.
Toxin 90 M.L.D. +1/350 c.c. Serum (350 units per c.c.)	Animal died 3½ days.

* Note Toxin C had not been tested by Ehrlich's method.

TABLE II.

Ehrlich's Method.

Dates	L+ Tests with Ehrlich's Serum: For	L+ Tests with Ehrlich's Serum: Result	L+ Dose Used Against Serum Tested	Number of Units Per c.c. Tested for: 300	310	320	325	330	350
May 7.......	.23 c.c.	—8*							
	.24 c.c.	—7							
	.24 c.c.	—6							
	.25 c.c.	—5							
	.25 c.c.	—3							
	.26 c.c.	—3							
July 9.......	.25 c.c.	+							
	.275 c.c.	+							
July 16......	.28 c.c.	—4							
	.3 c.c.	—3							
	.32 c.c.	—2							
Sept. 7......	.27 c.c.	—3							
	.28 c.c.	—3							
	.29 c.c.	—3							
Sept. 13.....	.26 c.c.	+	.26	+	+	—3	—3	—3	—2

TABLE III.

Ehrlich's Method.

Dates	Technique	L+ Tested For or Used	Number of Units per c.c. Tested for: 262.5	275	287.5	300	350
Aug. 31.......		.53 +					
		.53 +					
		.54 —5					
		.54 +					
Sept. 3.......		.55 —2					
		.55 —2					
		.56 —3					
		.56 —2					
Sept. 6.......		.545 —3					
		.545 —4					
Sept 13......	1	.545				+‡ —4‡	—3‡—4‡
	2	.545				—3 +	—3 —3
	2	.545				—4‡ +‡	—2‡—3‡
	3	.545				—4‡ +	—2 —2
	3	.545				—4 —4‡	—2‡—3‡
Sept. 19......	1	.545		+‡ +‡	—4 +	—4 —3	
	2†	.545		+ +		—4 —4	
	2†	.545		—4‡—4‡		—3 —4	
	3	.545		—4‡ +‡			
Sept. 27......	1	.545		+ +	—4‡ —4‡		
	2	.545	+‡ +‡		+ +		
	3	.545	+‡ +‡	+ +	+ +		
Oct. 10.......		.545 —3					
		.545 —4					
		.55 —3					
		.55 —3					
Oct. 18.......	3				+ +		

Technique No. 1. Ordinary 1 c.c. pipettes and ordinary syringes.
2. Dilutions made in titrated flasks. Ordinary syringes and Ehrlich pipettes used.
3 Ehrlich pipettes and Rosenau injecting syringes used.

* The interpretation of the signs in all the tables should be as follows:
+ = Animal lived.
— = Animal died.
Numerals = Days after injection on which animal died.
† Slight alterations in technique were made in these tests.
‡ Dilutions in these tests made at 15° C. All others at 23–25° C.

TABLE IV.

Ehrlich's Method.

Date	L + Tests with Ehrlich's Serum		L + Used Against Serum Tested	Number of Units per c.c. Tested for		
	For	Result		300	325	350
Sept. 29	.20 c.c. .21	—$2\frac{1}{4}$ ± —$1\frac{5}{8}$	.2	—$1\frac{1}{2}$	—$1\frac{1}{12}$ —$1\frac{1}{3}$ ±	—$1\frac{1}{3}$ ±

TABLE V.

Ehrlich's Method.

Dates	L+Tests with Ehrlich's Serum		L+Used Against Serum Tested	Number of Units per c.c. Tested For					
	For	Result		250	300	312.5	25	337.5	350
May 18	.74	—4							
	.745	—4							
	.75	—3							
May 27	.74	+							
	.745	—5							
June 4	.74	—6							
June 27	.745	—3*	.745*	+	+				
	.745	—6							
July 6	.74	—3	.74				—8		—3
	.74	—5							
July 15	.745	+	.745		+	+	+		
July 26	.745	+							
	.75	+	.75				+	—3	—3
Aug. 25	.74	+							
	.745	—3	.745		+		—3	—3	
	.75	—3							
Sept. 27	.745	—6				+	+		
	.745	—8							

The member making the tests in Table V desires to call attention to the fact that when the controls on the L+ showed the dose to be too low, the serum tests showed a corresponding increase in the antitoxic power of the latter. (Tests on July 15 and 26). The errors in these tests must therefore have been in the making of the original toxin dilution if the previous and subsequent tests for the L+ and the antitoxin are to be taken as a standard. On those occasions an unusual number of tests made a slight change of technique necessary.

The results of the tests shown in the various tables may be summarized as follows:

* The tests for L+ when performed upon the same date as those upon the serum were actually a part of the same series, and the diluted toxin injected was taken from the same cylinders with the same pipette for both the L + tests and the serum tests, thus controlling the dilution for the L+ with each serum test.

Taking the end reaction in Table 1 as the neutralization of the toxin, as prescribed for that method, the results indicate that the serum contained 300–325 units of antitoxin per c.c.

Taking the end reaction in the tests performed according to the Ehrlich method, as the death of the guinea pig on the fourth day, the results indicate as follows:

Table	2.	310-320	units	per	c.c.
"	3.	287.5-300	"	"	"
"	4.	Less than 300	"	"	"
"	5.	312.5-325	"	"	"

While these results appear to show a very fair degree of uniformity in the outcome of a series of such tests, an examination of the tables shows that many individual tests were quite out of harmony with the average, especially when slight changes in technique occurred. This would be more noticeable if all the tests performed on the serum were included as was not the case in Table 5 and Table 2 where some of the tests for L + were not given.

In the interests of economy of effort and in order to limit the number of tests which need to be performed on any one serum, and yet to attain as great an approach to accuracy and uniformity in results as possible, it has been deemed best by your committee to recommend that the procedures and precautions outlined below be adhered to in the making of tests for the determination of the strength of diphtheria antitoxic sera.

The committee recommend the adoption of the method for such procedures devised by Ehrlich, which, in a general way may be outlined as follows: First, the determination of the amount of diphtheria toxin necessary to kill in four days a guinea pig of approximately 250 grams weight when mixed with one unit of the Standard Antitoxic Serum; second, the determination of that amount of a serum which when mixed with this dose of toxin will prevent the death of a guinea pig of the same weight for four full days. This amount of a serum is to be considered as containing one unit of diphtheria antitoxin.

For the making of dilutions of both toxin or antitoxic sera, including the Standard Serum, the following recommendations are made:

First, that a sterile, 85 per cent solution of sodium chloride (C.P.) in water be used as the diluting medium.

Second, that either sterile glass containers (measuring cylinders and flasks), accurately graduated to contain the desired amount of salt solution, or of dilutions be used, or that sterile ungraduated containers to which the salt solution is distributed from accurately graduated burettes be substituted. Preferably the burettes should be those whose readings have been certified to by either the Prussian or American official testing bureaus. (Prussian, Physikalische technische Reichsanstalt. American Bureau of Standards, Washington).

Third, that for the measurement of the undiluted toxin or serum, including the standard serum, sterile capacity bulb pipettes with one mark certified graduations on the stem be used. Such pipettes should be washed out in the solution receiving their contents.

Fourth, that for the measurement of the diluted toxin or serum, sterile bulb outflow pipettes with certified graduations upon the stem be used.

Fifth, that the toxins and serums used be removed from the refrigerator just before their measurement, and the salt solution be at room temperature.

Sixth, that the total amount of the mixture of toxin and serum dilutions to be injected be as closely approximate to four c.c. as possible.

Concerning the size and number of the dilutions of both toxin and serum, the committee have decided not to recommend any one scheme, believing that any plan rigidly adhered to, and with the precautions recommended strictly observed, any suitable method should give approximately uniform results.

Several plans are used by the various members of the committee, and an outline of some of these will appear as an appendix to the report.

In injecting the mixture of toxin and antitoxin the following precautions are recommended to be taken:

First, that the syringe employed be one that will uniformly deliver its entire contents, including the emptying of the needle. For this purpose it has been found that the syringes of the Koch type are to be preferred to those having pistons. The system

worked out by Rosenau* of using the barrels of specially devised syringes of the Koch type as mixing chambers for the toxin and serum dilutions fulfils the above requirement, and has the advantage of doing away with the extra mixing chamber, and the necessity of drawing the mixture up into a syringe from such a chamber.

Second, that the mixture of toxin and serum dilutions be thorough and complete. To that end, and to permit time for at least the beginning of the union of the toxin and antitoxin to take place in vitro, it is recommended that the mixture stand for 15 minutes at room temperature (when not below 15° C.) before injection.

Third, that the injection be made subcutaneously into the subcutaneous tissues of the anterior abdominal wall of the selected guinea pig, the needle being introduced posteriorly and directed toward the median line.

Fourth, that the hair of the animal over the site of penetration be removed before the operation.

In the selection and general treatment of the guinea pigs to be the subject of these tests care should be exercised.

One of the members of the committee† has called special attention to the existence of strains which are unusually insusceptible to the poisonous effects of diphtheria toxin. This insusceptibility is transferred from the female possessing it to her offspring.

In laboratories raising their own guinea pigs care should be exercised in using for breeding purposes females which have survived injections of either toxin or toxin-antitoxin mixtures, inasmuch as their survival may have been due to a special insusceptibility to diphtheria toxin, and this character may be transmitted to their offspring.

The following recommendations are made concerning the selection and treatment of guinea pigs:

First, that only half-grown animals in excellent condition, and born of mothers not known to be unusually resistent to diphtheria toxin be used for these tests.

Second, that the animals shall weigh before feeding on the morning of the day of operation not under 235 or over 275

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*Bulletin Hygienic Laboratory, Public Health and Marine Hospital Service, 1904, 19.
†THEOBALD SMITH, Jour. of Med. Research, 1905, 13, pp. 341, 348.

grammes. Experience has shown that the animals coming within these limits are for all practical purposes evenly susceptible to diphtheria toxin.

Third, that after operation the animals shall be kept in cages, allowing three-quarters to one square foot of floor space per animal, without handling or disturbance other than what is absolutely necessary for careful daily weighing,* and for feeding them, for four full days. During this time any evidences of a pathological condition which can be observed without disturbance should be recorded.

Fourth, that after this period of four days the animal should be examined and weighed, and any condition of edema, induration, or necrosis at the site of injection recorded.

Fifth, that if the animal dies as a result of the test an autopsy should be performed, and the macroscopic pathological conditions noted. Especial attention should be paid to ascertaining whether the injection had been properly made into the subcutaneous tissues, or had been accidentally made into the abdominal cavity.

Your committee believe that an observance of the recommendations herein made will strongly tend towards uniformity of results and ease in the application of the test.

Inasmuch as the committee was without power to add to its number they desire to state that Dr. M. J. Rosenau, Director of the Hygienic Laboratory, Public Health and Marine Hospital Service, was invited to take part in the deliberations of the committee, and that they are indebted to him for valuable suggestions.

Respectfully submitted,

HERBERT D. PEASE, *Chairman.*
J. J. KINYOUN.
JOSEPH MCFARLAND.
WM. H. PARK.
THEOBALD SMITH.

* Any handling of the animals after injection may affect them injuriously and some members do not recommend the daily weighing. Any course decided upon should be adhered to for feeding them.

APPENDIX.

A choice in a system of diluting both the toxins and the sera in the determination of L+ dose, and in the regular tests for antitoxic strength, will depend on one's choice in the method of making the final injection of the mixtures. The methods in vogue for the latter are of two types: first, those that aim so to arrange the systems of dilution as to give approximately two c.c. each of the toxin and serum dilutions, and secondly, those that make up the final total of four c.c. by the addition of salt solution either to the final mixture or by using the additional salt solution for washing the last slight traces of the mixture in the syringe into the guinea pig.

If the first plan is chosen, then it is necessary to arrange the dilutions of the toxin so that the dose to be injected will be about two c.c. For example, if the L+ of a given toxin was suspected, or had been determined to be .21 c.c., it would require a dilution of 10 times in order to give that amount of toxin in approximately two c.c. (actually 2.1 c.c.) of the dilution.

For the dilution of the Standard Serum, the dilution given on the bottle as giving one unit in one c.c. would have to be doubled in order to obtain one unit in two c.c. For example, where the bottle label gives 1 c.c. of serum mixture plus 12.25 c.c. of diluent as a dilution containing one unit per c.c., it would be necessary to make a dilution of 1 c.c. of serum plus 25.5 c.c. of diluent in order to obtain one unit in two c.c.

For the dilution of the sera to be tested, all that is necessary under this system is to make dilutions such that the denominator of the fraction, which represents the amount of serum, in two c.c. of dilution, the same as the number of units per c.c. suspected of being contained in the serum to be tested.

Thus, if a given serum is to be tested for a possible strength of 300 units per c.c., a dilution of 1 c.c. serum + 99 c.c. salt solution, and of this 2 c.c. + 10 c.c. of salt solution will give $\frac{1}{300}$ c.c. of the original serum in 2 c.c. of dilution. By this system the addition or subtraction of 1 c.c. to or from the 10 c.c. of salt solution in the second dilution will raise or lower the units to be tested for by 25.

Where the other type of system is used, any or even no dilution of the toxin, and any dilution of the serum, giving in the amount injected that fraction of one c.c. of serum, the denominator of which represents the number of units to be tested for, will be sufficient for the performance of the test, and will only require the addition of the salt solution to make the total mixture four c.c. For example:

Toxin L+ = .21. .21 measured directly by pipette into cylinder holding final mixture or diluted 1 c.c. toxin + 4 c.c. salt sol. = .21 c.c. in 1.05 c.c. dilution.

Serum to be tested for 300 units per c.c.

1 c.c. serum + 19 c.c. salt sol.
1 c.c. of first dilution + 14 c.c. salt sol. = $\frac{1}{300}$ c.c. in 1 c.c. of second dilution.

Or another method:

1 c.c. serum + 9 c.c. salt sol.
1 c.c. of first dilution + 29 c.c. salt sol. = $\frac{1}{300}$ c.c. in 1 c.c. of second dilution.

The opportunities for error in measurement are, of course, the least in the greater dilution.

The work of these committees has settled nearly all the disputed points concerning the practical work of testing diphtheria antitoxins.

Further work looking toward the establishment of a standard test for tetanus antitoxin was undertaken early in the year, but nothing of a definite character was worked out. It would appear from some as yet incomplete tests as if a simple test could be devised which would give results sufficiently accurate for all practical purposes, but this can be more definitely stated only after its use for over a much longer period.

The educational features of the laboratory's work have not been lessened during the year. By personal communications, papers and informal addresses, the Director has endeavored to be of as much assistance to the members of the medical profession of the State as possible.

Respectfully submitted

HERBERT D. PEASE,
Director Antitoxin Laboratory.

CANCER LABORATORY.

REPORT.

BUFFALO, N. Y., *February* 1, 1905.

DR. DANIEL LEWIS, *Commissioner of Health, State Department of Health, Albany, N. Y.:*

Dear Sir—I have the honor to transmit herewith the Sixth Annual Report of the work done in the Gratwick Laboratory during the past year, and since the transmission of my last report. The Fifth Annual Report was in your hands February 1, 1904, but was not printed and distributed until the last of the year. Copies of it were placed in the hands of the Legislature the first week of January, 1905. Inasmuch as it was not printed until some time after its transmission, there were included within it some papers and results which it was desirable to publish, which were, nevertheless, not contained in the document first sent you. The report makes a printed book of some 160 odd pages, and contains papers of very great value to the scientific world, all of which were based upon work done in the Gratwick Laboratory by the various gentlemen connected therewith.

That the work done there of late has been active and original, as well as valuable, is attested by unfortunately sensational newspaper announcements which have been recently seen in the daily press of various parts of the country. That there was a basis of fact for these statements is attested by material contained within this report, but that any sensational headlines announcing the discovery of a cancer cure should have appeared is absolutely in no sense to be charged to any one connected with the Laboratory; it was the work of sensational headliners, which we all deprecate and deplore. There is but one pleasing feature to this expression of morbid sensationalism, and that is that it bespeaks a much more general and widespread interest in the subject than has obtained until recently, and it may perhaps be regarded as indicating that the public are anxiously awaiting something that may be of real and substantial benefit in this disease.

I take this most available method of disabusing the minds of any who may have felt that the officers of the Laboratory were in any sense responsible for the manner in which this matter was presented to the public, since the really only authentic statement of recent work done here was sadly garbled and misinterpreted by imaginative newspaper men.

The deaths reported as from cancer in the State of New York for the year ending December 1, 1904, were as follows:

TABLE I.

DEATHS FROM CANCER IN THE STATE OF NEW YORK FOR THE YEAR ENDING DECEMBER 1, 1904.

December, 1903	478
January, 1904	459
February	442
March	492
April	432
May	487
June	410
July	460
August	513
September	493
October	507
November	540
Total	5,713
For the year ending December 1, 1903	5,436
Increase	277

TABLE II.

STATISTICS BY YEARS FOR PAST SIX YEARS.

Year ending December 1, 1899	4,533
Year ending December 1, 1900	4,875
Year ending December 1, 1901	5,004
Year ending December 1, 1902	4,984
Year ending December 1, 1903	5,436
Year ending December 1, 1904	5,713

The increase over the previous year was not as marked as one year ago, nevertheless it is greater than can be explained by mere increase of population. Table II will show the statistics in this regard for the past six years, or since this Laboratory was constituted and began to concern itself with this subject. The expenses of the Laboratory for the fiscal year ending October 1, 1904, are indicated in the following table:

TABLE III.

LABORATORY EXPENDITURES FOR THE YEAR ENDING OCTOBER 1, 1904.

1903.	Equipment.	Stock and material.	Expense.	Salaries.	Total.
October	....	$32 45	$146 34	$726 65	$905 44
November	$6 28	14 83	93 78	789 98	904 87
December	263 59	98 97	348 64	772 98	1,484 18
1904:					
January	17 25	82 07	78 23	772 98	950 53
February	5 33	40 95	93 17	772 98	912 43
March	125 49	128 30	323 97	772 98	1,350 74
April	33 55	84 75	118 43	772 98	1,009 71
May	48 21	95 56	67 73	707 98	919 48
June	178 95	122 68	129 47	792 98	1,224 08
July	158 11	139 32	212 93	792 98	1,303 34
August	63 76	102 96	136 26	806 64	1,109 62
September	291 13	192 06	219 06	810 98	1,513 23
Total	$1,191 65	$1,134 90	$1,968 01	$9,293 09	$13,587 65

A series of papers by Dr. Clowes dealing with the problems in cancer metabolism have been incorporated in the Fifth Annual Report recently published. The investigations in question were commenced for the most part in 1902 and 1903 and completed in the spring of 1904.

During the present year we have had the good fortune to be able to attack directly the question of the curability of cancer. This object has been constantly before the working staff of the Laboratory, but it was not possible until February of last year, through the courtesy of Professor Jensen, of Copenhagen, who placed at the disposal of Dr. Gaylord two white mice inoculated with cancer, that this phase of the problem could be attacked with any hope of ultimate success. From the time of Dr. Gaylord's return to the Laboratory in February, an extensive line of experimentation was begun with these mice. The mice are infected with true cancer which can be transplanted into other healthy mice and in this way a constant supply of infected mice

be produced. Although mice are somewhat small for certain lines of experimentation, the work which has been conducted by Dr. Gaylord and Dr. Clowes, assisted by Mr. Baeslack, has already led to the determination of many important facts regarding transplantability in animals, questions of heredity, and to one discovery of the first importance which has already been published to the scientific world through the medium of the Medical News of January 14th of this year. The article follows:

SPECIAL ARTICLE.

AN ANTI-CARCINOMA SERUM.

By Harvey R. Gaylord, M. D., G. H. A. Clowes, Ph. D. and F. W. Baeslack, B. A., of Buffalo, N. Y.

(Preliminary report on the presence of an immune body in the blood of mice spontaneously recovered from cancer (adenocarcinoma, Jensen) and the effect of this immune serum upon growing tumors in mice infected with the same material.)

In the latter part of February one of us (Gaylord) visited Copenhagen and received through the courtesy of C. O. Jensen, Professor in the Veterinarian and Agricultural High School in Copenhagen, two white mice with actively growing tumors, inoculated from a strain of mice infected with adenocarcinoma, described by Jensen in the *Centralblatt für Bacteriologie,* Erste Abt., Vol. XXXIV. These mice were brought successfully as far as New York, but between New York and Buffalo both died. One of them was used on the day following death for the inoculation of 12 mice. The second mouse was placed on ice and on the third day following death the tumor was used to inoculate 25 white mice obtained from a source outside of Buffalo. All of the inoculations from the first mouse were unsuccessful. From the second mouse 60 per cent. of the inoculations were successful, thus giving us the material for further inoculation. From that time to the present we have succeeded in having constantly on hand a number of infected mice in various stages of the disease. Our transplantations were uniformly successful, the percentage of "takes" varying from 20 to 70 per cent.

In September and October we noted, for the first time in a number of mice that the tumors which had grown to a demonstrable size, ceased growing and underwent a form of spontaneous retrogression which terminated in the disappearance of the tumor without recurrence. Shortly after the observation of

these facts a combination of circumstances resulted in our having, for a period of time, but a few available tumor mice. For this reason certain experiments in immunity which had been previously commenced were suspended. In the latter part of November the supply of mice was sufficient to resume the immunity experiments. In the meantime we had succeeded in getting a large number of mice in which the transplanted tumor grew with unusual rapidity and great virulence, showing no tendency to retrogression. For the purpose of determining whether the blood of the mice that had recovered spontaneously possessed any immunizing qualities, a series of experiments was carried out with the following results:

The blood-serum of mice which had recovered spontaneously from tumors possessed a power, when injected into mice infected with growing tumors of inhibiting the growth of large tumors and causing the retrogression of smaller tumors, leaving the animal possessed of an immunity which prevents recurrence of the growth. The degree of immunity in the mice thus far tested varies within considerable limits, the most marked illustration of its activity being found in one mouse whose blood-serum injected in a single dose of .2 c.c. caused the rapid retrogression and entire disappearance of two tumors in one animal and one in another, all of which were as large as peas, in the space of three days. The same serum injected into a mouse with a tumor the size of a small cherry (about two grams), caused a noticeable reduction in size of the tumor, which remained stationary for ten days, when an operation for the removal of a portion of it resulted in a return of activity to the growth. The latter part of this experiment will be dealt with in our final publication.

All of these experiments were controlled with mice inoculated at the same time, the tumors of which were smaller than those of the mice treated with the immune serum. These control mice received doses of normal mouse serum equal in volume to the doses of immune serum referred to above. In every case the tumors in the control mice developed rapidly and led in the course of three or four weeks to the death of the animal. In spite of the fact that the control tumors were invariably smaller than those used for the immune serum at the commencement

of each experiment, in the course of a week or ten days the control tumors were found to be larger, and up to the date of making this announcement, while several control mice have died of their tumors, not a single mouse treated with immune serum has so far succumbed. In those cases in which the tumor was too large or the immune serum too weak to effect the cure, the marked retardation in the development of the tumor was always associated with a diminution in the cachectic symptoms invariably exhibited by the tumor mice in the last stages.

The second stage of our work has shown that the mice cured by injection with the immune serum referred to above, possess in like manner active immune qualities in their serum, which thus far have proved capable of causing the disappearance of small tumors and the inhibition of larger ones.

The test tube experiments carried out to determine the nature of this serum, and such information as we have been able to obtain as to the mechanism of its activity from sections of tumors inhibited and cured, lead us to the conclusion that in all probability we are not dealing with a cytolytic serum. We wish, however, to reserve our opinion until we have accumulated more data. Sections of tumors which have undergone partial spontaneous retrogression show that the changes in the epithelium are closely allied to simple atrophy. The connective tissue stroma of the tumor increases greatly in amount and in the last stages nothing is found but a connective tissue nodule with occasional pseudogiant cells produced by coalescence of the remaining rests of epithelium, similar to those described by Becker and Petersen as an evidence of spontaneous healing at the margin of cancer in human individuals. The changes in the tumors inhibited in growths show about the periphery a marked increase in the connective tissue stroma with extensive round-celled infiltration, characteristics which are not found in the growing tumors. At the margin of these tumors one finds an actual disintegration of cancer nests, atrophy of the epithelium, giant-cell formation and final disintegration. The remains of the small tumors, which have disappeared under the influence of the immune serum, consist of minute masses of connective tissue which in the later stages present the characteristics of ordinary organizing connective tissue. A

tumor which received but one injection of immune serum from a mouse cured of a small tumor by the activity of serum from a spontaneously cured mouse and which decreased from the size of a small pea to that of a grain of rice within 36 hours, and which remained stationary for 10 days, was found on examination to consist of a mass of newly-formed connective tissue surrounding the remnants of atrophied and disintegrating epithelium. In this case the evidence of disintegration of the epithelium was greater than that found in the tumors spontaneously recovered. A description of the histological characteristics will show that the changes in the epithelium are similar in principle, differing only in the rapidity of the process. The changes found in the spontaneously cured tumors and in those inhibited or cured with the immune serum, correspond to the changes already described by several authors as an attempt at spontaneous cure in human cancers.

A review of the literature shows that authentic cases of spontaneous cure of cancer in human beings are not unknown and the correlation of our histological findings with those already noted in man lead us to the conclusion that a similar immunity undoubtedly exists against human cancer. Although our work thus far has shown us that great difficulties will undoubtedly be encountered, it is perhaps not too much to hope that a careful analysis of the facts obtained in our experimentation on mice may ultimately lead to a practical application of these facts with a solution of the question of the curability of cancer in human beings.

The possession of these mice and the discovery already made have opened up a field of the widest scope, sufficient to engage the working staff of the Laboratory in fruitful researches for some time to come. From what has already been determined it may be stated that in principle it has been shown that cancer may prove a curable malady and that the medium through which this cure can be brought about may be a serum developed along the lines pointed out by the experimentation with mice.

In order that this work may be pursued to the best advantage during the coming year, it is essential that the Laboratory should not be hampered by want of necessary funds. Profitable experimentation could be begun at once if we were in possession of one

or two of the simian apes, such as the orang-outang or chimpanzee. These animals are expensive and difficult to keep, but at the present time offer the most hopeful line for experimentation. The expense of procuring two or three of these animals and caring for them for a year would be several hundred dollars, and yet they constitute the nearest approach to human beings and offer our best and most promising subjects until such time as an enlightened public sentiment permits the utilization of condemned criminals or the incorrigibly wicked for this purpose.

Meantime Dr. Calkins has been active in his portion of the work, which has mainly included the biological work, ready always in an advisory capacity and all other directions. During the past summer he visited all the important biological laboratories in Europe, where he compared notes with the best known observers abroad, and came home with widened experience and views which will prove of great importance to the scientific world so soon as he has a chance to formulate them. During the past year a biological explanation for the origin of cancer has been advanced through the writings of Professor Farmer of the Royal College of Science, London, and his work has led to considerable discussion and has been the basis for active research in the Laboratory of the Cancer Committee of the College of Physicians and Surgeons, England. Those who advocate this theory believe that the cause of cancer is to be found in certain changes in the cells, especially in their methods of division. We are fortunate in having on our staff a man of Professor Calkins' special training, who will be able to deal advantageously with this question through the material obtained from our infected mice. Dr. Calkins is now actively engaged in a piece of research work which will undoubtedly throw some positive light upon this side of the question. It may perhaps be tentatively stated that the work thus far done in this connection does not lead to the conclusion that the theory advanced is satisfactory or of particular importance.

For some time, a year ago, and during the long and severe illness of Dr. Gaylord, Dr. Matzinger was employed in the histological and pathological work of the Laboratory, which included, especially, accurate records of inclusion studies made for Dr. Calkins. At that time and later he carried on a series of inocu-

lation experiments with cancer from human beings upon small animals and pigeons. He also charted a large number of breast tumors as to position, shape and gross appearance, in relation to the structure of the gland and the nipple, and collated this with as much history as was obtainable regarding the supposed cause, first appearance and functional appearance of gland activity and also with the extent of post-climacteric involution. During the past summer he assisted in the work upon animals and search for animal tumors, finding them in a white rat, three horses and a dog, and making a series of transplantation experiments. During the past winter he visited three cancer districts in the southern and western parts of this State, carefully studying their statistics and topography with reference to epidemic expressions of cancer. More lately he has been studying blood changes in the cancer mice, as well as normal fluctuations of blood counts and temperature in small animals, as a basis for the study of their variations in disease. The other workers in the Laboratory have faithfully followed the directions and labors of their chiefs and the institution has, save during the hot summer months, presented every indication of activity and interest.

It will be seen that a large part of the work at present consists of experimentation upon the smaller animals, and this is made necessary by the inadequacy of our accommodations for large animals and by the greater ease and convenience of conduct of the work. The problems now before us demand work on a larger scale, and it is most desirable that accommodations be afforded, as well as means provided, for the care in the future of large animals, and especially for providing and experimenting with two or three of the largest simian apes. These can be imported, and in such a way that we do not have to pay for them unless they arrive in a condition of good health. They offer the best substitute for the work on which human beings must finally be tested before it can be known whether the prize has been attained or not.

And this leads me to elaborate a little upon a statement already made above. I have often been led to wonder when a perverted and false sentiment would permit the use of a certain class of criminals serving life sentences, or of the criminally and incurably insane, or the utilization of the dangerous, useless and

menacing classes of prisoners, for legitimate scientific and therapeutic experimentation. They are of no use to society; they are a constant menace to our welfare; they are not deterred from criminal activity by any fine altruistic sentiment; they exist but to do harm; they have to be separated from society in order to protect the latter; and there appears to be no good reason, save an undiscriminating false sentiment, why they should not be made to use in this, and apparently, the only way by which they can ever be serviceable to the community.

The problem of the cure of cancer, the most important now before the human race, since almost every other diseased condition is preventable, if not curable, can only attain its final solution after a reasonable test upon human beings. This, of course, ought to be made under the most judicious and temperate conditions, but it certainly ought to be made, and upon such people as these I have indicated.

Regarding the future of the institution and its needs, I would remind you first of all that with the work in its present aspect it is not possible to carry it on at a less expenditure than is incurred at present. You will remember that the State is at no expense for accommodations, these being furnished by the University of Buffalo, through the liberality of the Gratwick family. The expenditures recounted above include those for maintenance of the building and not for rent.

Again, there came from all quarters and at frequent intervals, imploring letters from sufferers from this disease, who are quite unable to pay for treatment and who yet would furnish most valuable subjects for study and comparison. If we were able to provide for a certain number of weeks of hospital care for such patients,—in other words, if it were possible to expend fifteen hundred or two thousand dollars each year for this purpose, the greatest good would come from a trifling expenditure.

Therefore, if in your wisdom and that of the Legislature, the appropriation could be increased from $15,000 to $20,000, with the avowed intention of making it include provision for large animal experimentation and care of patients, it would permit much more and much better work to be done than has yet been possible.

I therefore respectfully urge the wisdom not only of renewal of the previous appropriation of $15,000, but its increase to $20,000.

In the meantime, I have to thank you for the cordiality with which our efforts have been received by yourself, and bespeak your continued and enduring interest in the work.

I have the honor to be,

Very respectfully,
ROSWELL PARK, M. D.,
Director Cancer Laboratory.

BUREAU OF PATHOLOGY AND BACTERIOLOGY,

ALBANY, N. Y., *December* 31, 1904.

DR. DANIEL LEWIS, *Commissioner, State Department of Health, City:*

Dear Sir.—I beg to report on the work done by the Bureau of Pathology and Bacteriology during the year 1904.

	Diphtheria.		Sputum.	Widals.	Water.		Miscellaneous.	
January.....	Positive	26	9	4	Passed...	15	Ice	1
	Negative	35	10	13	Condemned	8		
	Total,	61	19	17		23		
February....	Positive,	26	9	5	Passed,	13	Milk,	1
	Negative,	18	8	5	Condemned,	8	Hydrocele fluid,	1
	Total,	44	17	10		21		
March.......	Positive	21	13	0	Passed	14	Urine,	1
	Negative,	39	23	8	Condemned,	11		
	Total,	60	36	8		25		
April........	Positive,	17	6	1	Passed,	35		
	Negative,	28	14	3	Condemned,	2		
	Total,	45	20	4		37		
May.........	Positive,	15	13	2	Passed,	28	Blood other than Widals	2
	Negative,	22	12	6	Condemned,	4		
	Total..	37	25	8		32		
June........	Positive,	30	11	2	Passed,	31	Ice,	3
	Negative,	13	12	7	Condemned,	8	Milk,	
	Total,	43	23	9		39		
July.........	Positive,	14	12	0	Passed,	31		
	Negative,	22	21	2	Condemned,	6		
	Total,	36	33	2		37		
August......	Positive,	21	19	7	Passed,	38		
	Negative,	44	16	9	Condemned,	3		
	Total,	65	35	16		41		
September...	Positive,	9	6	4	Passed,	45	Sewage,	[illegible]
	Negative,	38	15	12	Condemned,	6		
	Total,	47	21	16		51		
October......	Positive,	47	16	12	Passed,	22		
	Negative,	39	19	8	Condemned,	3		
	Total,	86	35	20		25		
November ...	Positive,	56	14	0	Passed,	23		
	Negative,	75	18	9	Condemned,	14		
	Total.	131	32	9		37		
December....	Positive,	54	11	2	Passed,	11	Urine for tubercle bacilli	
	Negative,	66	16	11	Condemned,	2		
	Total,	120	27	13		13		1
1904: Total,	Positive,	336	139	39	Passed,	306		0
	Negative,	439	184	93	Condemned,	75		12
	Total,	775	323	132		381		12

For purposes of comparison I have added the following table which summarizes by years all the work done by this Bureau since its beginning.

	Diphtheria	Sputum	Widals	Water	Miscellaneous
1901 (8 mos.).	62	7	3	43	3
1902.........	637	39	25	98	14
1903.........	677	124	68	269	16
1904.........	775	323	132	381	12

Respectfully submitted,

R. M. PEARCE,

Director.

FOOD AND DRUGS.

REPORT OF WILLIS G. TUCKER, M. D., Ph D

DIRECTOR BUREAU OF CHEMISTRY, NEW YORK STATE DEPARTMENT OF HEALTH.

DANIEL LEWIS, M. D., *Commissioner, New York State Department of Health, Albany, N. Y.:*

Sir—During the year ended December 31, 1904, 95 samples of water from different parts of the State, and various miscellaneous articles submitted from time to time, have been examined and reported upon. In August the director visited Sidney and inspected the water supply, taking samples for analysis, and during the year he has given information and advice to many correspondents on matters relating to food and drug adulteration and legislation, water supply, pollution and purification, and kindred topics. A statement of the work done during the year is now transmitted as follows:

January 5. Reported on the examination of two samples of formaldehyde solution, received December 30, 1903, from Dr. Wallace Clarke, health officer, Utica. Results as follows:

Sample labelled "No. 1, P. A. Coy." Sp. gr. at 60 deg. F., 1.0823 Formaldehyde, 37.7%.

Sample labelled "No. 2, W. Coy." Sp. gr. at 60 deg. F., 1.0892 Formaldehyde, 36.8%.

January 5. Received sample of water from Dr. A. E. Wage, health officer, Albion. Ordered examined January 6. Analyzed and reported upon January 12.

January 8. Received three samples of water from Dr. J. C. Clark, health officer, Olean. Ordered examined January 7. Analyzed and reported upon January 14.

January 8. Reported upon the analysis of three samples of water received from Dr. O. J. Hallenbeck, health officer, Canandaigua, December 30, 1903, and ordered examined on December 24.

January 22. Received from Dr. D. E. Lake, health officer, Fulton, three samples of medicinal preparations alleged to be of

inferior quality. Original samples of these articles were subsequently obtained, examined, and reported upon March 25.

January 29. Received samples of water from Dr. D. T. Condict, health officer, Goshen. Ordered examined January 29. Analyzed and reported upon February 3.

February 4. Received sample of water from Dr. H. C. Finch, health officer, Broadalbin. Ordered examined February 4. Analyzed and reported upon February 10.

February 12. Received two samples of water from Dr. S. A. Wessels, health officer, Canajoharie. Ordered examined February 13. Analyzed and reported upon February 17.

February 16. Received from office of the department a bottle of fluid of which an examination was directed for the purpose of determining if it obtained zince sulphate or chloride. Examined same and reported on February 27 that it contained a large amount of zinc chiefly as chloride.

February 16. Received from Prof. O. H. Landreth, C. E., from Watertown, four samples of water. Ordered examined February 16. Analyzed and reported upon February 23.

February 19. Received sample of water used for drinking in one of the offices in the capitol. Ordered examined February 19. Analyzed and reported upon February 25.

March 9. Received sample of water from Dr. A. A. Young, Newark. Ordered examined February 23. Analyzed and reported upon March 16.

March 25. Reported as follows on the examination of certain medicinal preparations concerning which a complaint had been received and ordered investigated on January 22.

ALBANY, *March* 25, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany N. Y.:*

Dear Sir:—In the matter of the complaint of Dr. A. L. Hall, of Fulton, N. Y., concerning certain samples of medicinal articles which had been forwarded to the department by Dr. D. E. Lake, health officer of Fulton, at his request, I beg to report as follows:

The articles alleged to be of inferior and unsatisfactory quality were the following: (1) "Elixir Calisava, Nux Vomica and Phosphoric Acid." On the label it is stated that "each fluid drachm contains calisava bark, 5 grains; tincture of nux vomica, 5 minims; phosphoric acid, dilute, 10 minims." (2) "Compressed

tablets of strychnine sulphate, 1-30 grain." (3) "Soluble compressed tablets of Triple Bromides, 15 grains; Potass. bromide, 5 grains; sodium bromide, 5 grains; ammrn. bromide, 5 grains." Samples described as above were forwarded by Dr. Lake and received by me on January 23, and they were subsequently fully described in a letter received from Dr. Hall and dated February 6, 1904. As the analysis of such articles, and particularly of elixirs of the kind submitted, presents certain difficulties, and as the results obtained in such cases are not always entirely satisfactory, I was at first of opinion that their examination was unadvisable, but further particulars concerning the samples having been supplied and their examination directed, I obtained, by your advice, original packages of the three articles complained of through Messrs. Walker & Gibson, of this city, and they have been examined with the following results:

(1) "Elixir Calisava, Nux Vomica and Phosphoric Acid." This is not an official preparation. Cinchona calisava, like all the cinchona barks, is a highly complex substance, containing, or yielding, a very large number of different alkaloids, together with various acids, coloring matters and other constituents. Tincture of nux vomica, which is prepared from the extract, is likewise a very complex substance, and it is impossible to determine directly the qualities of such composite constituents in mixtures of this kind, and the usual processes of assay, in which the principle alkaloids are determined, are not readily applied to elixirs containing syrup and other constituents. And in this instance the difficulty is increased owing to the relatively small amount of the active constituents which would, in the case of the nux vomica alkaloids, amount to but about one-tenth of a grain in each fluid ounce. As a consequence, attempts to extract the alkaloids and bring them into a weighable condition resulted unsuccessfully and, in the absence of an official method applicable to such preparations, were abandoned. It is by no means asserted that the extraction and estimation of the principal alkaloids in such a case is impracticable, but it is attended with many difficulties, and if accomplished would not admit of a statement of the actual quantities of bark and nux vomica which had been employed in the preparation of the article examined since, as already stated, these are highly complex bodies and of variable composition. The amount of phosphoric acid, however, was determined and found to be equivalent to seven grains, or practically seven minims, of diluted phosphoric acid in each fluid drachm. This variation from the amount claimed is not very material, and the preparation seems to compare favorably with similar articles of the class to which it belongs, and shows no evidence of wilful sophistication.

(2) Strychnine tablets. These were assayed by the method of the United States Pharmacopoeia prescribed for the assay of extract of nux vomica, and also by the method of the British Pharmacopoeia, and yielded by the former process 1-62 of a grain, and by the latter 1-58 of a grain of strychnine sulphate in each tablet. These tablets contain starch, which is a proper excipient in such cases, and they quickly disintegrate on the addition of water. It is alleged by the complainant that they are "insoluble," and also that they do not disintegrate in water. Starch is, of course, insoluble in cold water, but the tablets disintegrate promptly and satisfactorily, and this is found to be the case both with the tablets submitted and with those purchased.

(3) "Soluble Compressed Tablets of Triple Bromides." These have an average weight of 15.2 grains and they are readily soluble in water. They contain, by the method employed in examining them, in each tablet, 7.13 grains of ammonium bromide; 6.79 grains of sodium bromide; and 1.07 grains of potassium bromide. These results indicate incomplete admixture of the constituents, but as all three bromides have practically the same therapeutic properties, and as the ammonium bromide, which is most largely present, is the most expensive of the three salts, while potassium bromide, which is present in the smallest quantity, is the cheapest, these results are not indicative of intentional sophistication in my opinion.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

March 26. Received sample of water from Rome State Custodial Asylum. Ordered examined March 29. Analyzed and reported upon April 5.

March 26. Received sample of water from Dr. J. T. Horton, health officer, Hammondsport. Ordered examined March 29. Analyzed and reported upon April 5.

April 12. Received two samples of head-cheese suspected to have caused illness, from Dr. H. C. Sutton, health officer, Rome. Ordered examined same day. Examined and reported upon April 25 as follows:

ALBANY, *April* 25, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.*

Dear Sir—On April 12th I received from you by messenger a sealed package containing a wooden box in which were two sam-

ples of head-cheese with a communication of same date stating that the samples had been received from Dr. H. C. Sutton, Health Officer, Rome, N. Y., through Wilson Huff, Milk and Meat Inspector, who states as follows:

"I send to you two samples of head-cheese, one from a meat market, and the other from parties who were made ill after eating of the cheese. The cheese was all made Friday, April 1st last. There are several more persons made ill from eating the cheese, which was peddled about the city. Those who complained to me were taken with gastro-intestinal troubles."

On opening the box I found it to contain two packages. One of these was marked: "This is some of the head-cheese family of four ate. All taken sick about same time." It contained two pieces of the cheese weighing in all 205 grams. It had a fairly good, and not markedly disagreeable, odor and, aside from the presence of some small patches of white mould, it had a natural appearance. The other package was marked: "Sample from another piece from market." Its weight was 125 grams. Its odor was not disagreeable and no mould was observed on its surface."

It has long been known that putrefactive changes taking place in many kinds of animal foods may produce poisons of an alkaloidal nature, but such products are, in many cases, very unstable and their isolation and identification is attended with many difficulties and is sometimes impossible. The whole subject indeed is involved in much obscurity. In their work on Ptomains and Leucomains, Vaughan and Novy say in the section dealing with the examination of poisonous foods:

"In a large proportion of the instances we are ignorant not only of the chemistry of the poisons which induce the untoward effects, but of the bacteria through the activity of which these poisons are generated. Moreover we cannot in cases of food poisoning draw a sharp line of distinction between intoxication and infection. Food-poisoning may originate in any one of the following ways: (1) The food is infected and the poison is generated only and wholly before the food is taken. (2) The infecting organism may begin the elaboration of its poisonous products outside of and continue the same process inside the body. (3) The infection may not result in the production of poisons until the food is taken into the body."

It may therefore readily be understood that foods may produce poisoning despite the fact that the analyst may be unable to demonstrate the presence of toxic agents in the articles submitted to him for examination. And since small samples are generally submitted, as in this instance, the difficulties are enhanced. The sample may be merely the bearer of the germ and

unless this germ be isolated and its toxicogenic property demonstrated, a chemical examination may be of little value.

Nevertheless an attempt was made to obtain evidence of the presence of some ptomain, the Stas-Otto method being employed In this method the first extraction, after acidification, is made with alcohol, and the final extraction, of the alkaline fluid, is made with ether. A portion of the final ether extract tested with potassium ferricyanide and ferric chloride gave a prompt reduction and resulting blue color, which is characteristic of the ptomains but may be reduced by other substances. With other reagents negative results were obtained. Portions of the ether extract were also kindly tested for me by Dr. Pearce, of the Bender Laboratory, but it failed to produce any effect upon a guinea-pig or a mouse. The mouse received one-fifth of the material subcutaneously, and the pig four-fifths intraperitoneally, observation being made at the end of forty-eight hours. The results of the examination therefore afford no positive proof of the presence of ptomains in the material operated upon.

There being a possibility that the illness said to have been caused by eating this head-cheese might have been the result of the presence of some metallic poison I examined other portions of the same for such but discovered no evidence of the presence of arsenic, antimony or other poisonous metals.

I am inclined therefore to think that the illnesses said to have followed the eating of this head-cheese resulted from some cadaveric poison or infecting organism despite the fact that the presence of such poison or organism has not been established.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

April 16. Received two samples of water from Tarrytown, sent by J. J. R. Croes, C. E. Ordered examined April 19. Analyzed and reported upon April 22.

April 16. Received eight samples of water from Dr. W. T. Tanner, Oneida. Ordered examined April 25. Analyzed and reported upon May 5.

April 25. Received sample of water from Dr. J. L. Hanmer, health officer, Middletown. Ordered examined April 26. Analyzed and reported upon May 7.

April 27. Received sample of water from State Custodial Asylum, Newark, sent by J. J. R. Croes, C. E. Ordered examined

April 27. Received sample of water from Rochester State same day. Analyzed and reported upon May 7.
Hospital; sent by J. J. R. Croes, C. E. Ordered examined same day. Analyzed and reported upon May 7.

May 6. Received sample of water from Mr. M. E. Kenyon, Secretary board of health, Moravia. Ordered examined May 10. Analyzed and reported upon May 14.

May 17. Received three samples of water from Dr. A. E. Wage, health officer, Albion, by order of J. J. R. Croes, C. E. Ordered examined May 18. Analyzed and reported upon May 23.

May 25. Received sample of water from Dr. Snyder, health officer, Newburg. Ordered examined same day. Analyzed and reported upon May 27.

June 17. Received sample of sausage meat suspected to have caused illness from office of department which had been sent by Dr. W. L. Wilson, health officer, Scotia. Ordered examined same day. Examined and reported upon June 27 as follows:

ALBANY, *June* 25, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.*

Dear Sir—On the 17th instant I received from you a sample of sausage meat, together with a communication of same date directing that an examination be made of it, and stating that it had been "received from Dr. William L. Wilson, Health Officer of Scotia, N. Y., it being claimed that the specimen sent to you is a portion of some that had been purchased by Herman Reynolds of A. P. Herrick, of Scotia, on June 14, 1904, the following statement being made by Dr. H. V. Mynderse: "The sausage was eaten at supper that evening by the family and at 11:30 p. m., I was called to attend five members of the family who were suffering from pain in the abdomen and vomiting. All recovered and are well."

The sample as received by me consisted of several thin slices cut from a bologna sausage and wrapped in brown paper tied with a string. The package was not sealed and it bore no marks of any kind. The weight of the meat was about seven ounces. Nothing unusual was observed in its appearance except that its color was rather decidedly pinkish. Its odor was that of ordinary bologna sausage and not indicative of decay, and the meat was firm, and indeed very tough in its tenure, and free from mould. No foreign matter of any kind was discovered upon any of the pieces which were carefully examined.

Aside from any question as to the difficult digestibility of such food as this, sausages of this kind containing much gristle and

being often artfully compounded from meat of the poorest quality and coarsest fibre and in its essential nature unfit food for children or persons with weak or disordered digestion, the illness which is said to have followed the use of this article might have resulted from some harmful coloring agent employed either in the filling or upon the casing in which contained, or from putrefactive alkaloids developed by incipient decay, or from some active poisonous substance accidentally, or intentionally and maliciously, added. The exterior surface of such sausages is frequently artificially colored, as is also the filling, but a search for coal-tar or other foreign colors failed to reveal the presence of any such in this instance. A careful examination, however, was first made by the Stas-Otto method as recommended by Vaughan and Novy for cadaveric alkaloids, or ptomains, and while the final ether extract yielded on evaporation a substance gave a prompt reduction with ferric chloride and potassium ferricyanide, indicative in a way of ptomains, but also produced by other reducing agents, the product obtained from the ether extract responded to no other tests, and the reaction mentioned alone is insufficient to prove the presence of ptomains, although, under the circumstances, suggestive of their presence. It is to be noted that the quantity supplied in this instance weighed less than half a pound, and that parts of this were necessarily employed in making other tests, and that to isolate the chemical products of decay, if any were present, from so small a quantity as was necessarily employed for the purpose, would be a difficult and might well be an impossible task. I have recently pointed out, in a report made on April 25 last on a very similar case, that the sample furnished in such cases may be merely the bearer of the germ, and that unless this germ be isolated, and its toxicogenic property demonstrated, a chemical examination may be of little value. So that while it is by no means impossible that the illness complained of in these cases may have resulted from the products of incipient putrefaction, I am by no means able to assert, as a result of this examination, that such was in reality the case, and am indeed inclined to think, taking all the facts into consideration, that some other explanation must be sought.

Therefore another portion of the meat was examined for metallic poisons which might accidentally have gained access to it or have been purposely added, but no trace of arsenic, antimony or other irritant metallic poison was detected.

In order that a conclusion might be reached as to the probable cause of this illness fuller information than has been supplied would be essential. I am not informed as to the number of persons who partook of this food and have therefore no knowledge as to how many may have eaten it and suffered no ill effects, nor

do I know the ages of those who suffered, nor the amount consumed by them, nor what other articles were eaten along with it. In my opinion such food as this is exceedingly indigestible and ought not to constitute the staple of a meal, or be largely eaten by children or by persons whose digestive organs may be enfeebled or deranged. In the course of my examination I observed that even on long boiling with dilute acids it undergoes disintegration very slowly. The first effect of heat and acids upon it is to coagulate it and render it tought and rubbery, and this confirms me in the opinion that it must be of difficult and very slow digestibility. It is evident that such food as this, at its best, might well give rise to acute digestion accompanied by the symptoms (abdominal pain and vomiting) which were observed in these cases, and especially if eaten in immoderate quantity, and, as it appears from the information supplied that the patients speedily and completely recovered, I am inclined to think that an explanation of the illness this food is thought to have occasioned may perhaps be found in the essential nature of the food itself. At all events it cannot be affirmed as a result of the examination made that the illness was occasioned by any extraneous substance or decomposition product, and the examination has been as complete as under the circumstances was practicable.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

June 21. Received four samples of water from Waterloo, sent by J. J. R. Croes, C. E. Ordered examined June 21. Analyzed and reported upon June 27.

June 21. Received sample of water from office of department by Mr. H. C. Gott. Ordered examined same day. Analyzed and reported upon June 22.

June 30. Received two samples of water from Dr. William Landt, health officer, Mohawk. Ordered examined June 27. Analyzed and reported upon July 8.

June 30. Received ten samples of water from Dr. W. T. Tanner, health officer, Oneida. Ordered examined same day. Analyzed and reported upon July 16.

July 9. Received sample of water from Dr. Frank I. Smith, Barryville. Ordered examined July 8. Analyzed and reported upon July 16.

July 12. Received four samples of water from Waterloo, sent by J. J. R. Croes, C. E. Ordered examined same day. Analyzed and reported upon July 20.

July 14. Received two samples of water from Mr. Peter Deyo, office State Tax Commission, Albany. Ordered examined same day. Analyzed and reported upon July 25.

July 15. Received sample of water from Mr. M. E. Kenyon, Secretary board of health, Moravia. Ordered examined July 18. Analyzed and reported upon July 25.

July 16. Received sample of water from Dr. D. D. Daly, health officer, Ellenburg Depot. Ordered examined July 20. Analyzed and reported upon July 26.

July 20. Received sample of water from Dr. A. C. Aldrich, Lyons. Ordered examined same day. Analyzed and reported upon July 28.

July 20. Received a sample of mustard from Dr. C. L. Furman, health officer, Oriskany Falls, suspected to contain some deleterious constituent. Examined same and reported as follows:

ALBANY, *September* 2, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.*

Dear Sir—On July 20 last I received from you a sample of ground table mustard which had been submitted by Dr. C. L. Furman, health officer, Oriskany Falls, N. Y., and which was suspected to contain some harmful adulterant, of which you directed that an examination be made. It was contained in a pasteboard box, labelled "Honeysuckle Brand, absolutely pure mustard. A. Ethridge & Co., Rome, N. Y."

On examination I find it to be free from mineral or starchy or other vegetable adulterants or make-weights. On incineration it yields 5.09% of ash, which is a fair average for genuine ground mustard. No coal-tar color, turmeric, or other foreign coloring matter was detected in it. Nor do I find in it any evidence of the presence of any substance, foreign to mustard, which could have produced the results said to have been attributed to its use.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

July 22. Sample of water received from Dr. D. C. Lowenstein, health officer, Rye. Ordered examined July 20. Analyzed and reported upon July 28.

July 26. Received sample of water from Dr. F. S. Cole, health officer, Schroon Lake. Ordered examined same day. Analyzed and reported upon July 29.

August 4. Received four samples of water from Dr. O. J. Hallenbeck, health officer, Canandaigua. Ordered examined August 8. Analyzed and reported upon August 16.

August 10. Visited Sidney, inspected part of water supply system, and took two samples of water with Dr. J. V. Winne, health officer. These samples were examined and reported upon August 16.

August 19. Received five samples of water from Dr. D. C. Lowenstein, health officer, Rye. Ordered examined August 20. Analyzed and reported upon August 31.

August 23. Received four samples of water from Dr. L. B. Rulison, health officer, Watervliet. Samples taken under direction of O. H. Landreth, C. E. Ordered examined August 19. Analyzed and reported upon August 31.

August 31. Received sample of water from Dr. L. H. Smith, Palmyra. Ordered examined September 3. Analyzed and reported upon September 7.

September 13. Received three samples of water from Dr. F. L. Smith, health officer, Barryville. Ordered examined September 14. Analyzed and reported upon September 19.

September 17. Received sample of water from Dr. A. O. Bogert, health officer, Nanuet. Ordered examined September 22. Analyzed and reported upon September 26.

September 23. Received sample of water from Dr. J. R. Selover, health officer, Trumansburgh. Ordered examined September 26. Analyzed and reported upon September 28.

September 28. Received a sample of sewage from Dr. J. N. Pryor, superintendent, Raybrook State Tuberculosis Hospital. Ordered examined same day. Analyzed and reported upon as follows October 3:

ALBANY, *October* 3, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.*

Dear Sir—I respectfully enclose herewith report in duplicate on the analysis of a sample of sewage from the Raybrook Hospital received by your order on September 28, 1904. No particulars concerning the sample other than those supplied upon the label and noted in the report were received and I am therefore unable to construe the results or give an opinion concerning them, and, indeed, have not been requested to do so. I may say, however,

that in some respects the sewage is peculiar. The chlorine is very low and albuminoid ammonia, nitrogen in nitrates, total solids and mineral matter, are also low for ordinary sewage, while oxygen consumed and free ammonia are fairly high. Nitrogen in nitrites is absent, as is not infrequently the case in recent sewage. But the results may more intelligently be construed by those familiar with the origin and treatment, if any, which this sewage has received.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

ANALYSIS OF SEWAGE FROM RAYBROOK STATE HOSPITAL.

(Results are parts in 100,000.)

Received from Dr. J. N. Pryor, Superintendent Raybrook State Hospital for Tuberculosis; date received, September 28, 1904; how labelled, "Taken from a point at which sewage runs out of ground after passing through sand bank, Tuesday, September 27, 3 p. m." Appearance: Color, milky, opalescent; turbidity, opaque; sediment, decided, whitish. Odor at 100 deg. F., highly offensive; chlorine in chlorides, 1.30; free ammonia, 1.4575; albuminoid ammonia, 0.2850; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0136; oxygen consumed, 4.3660; total solids, 31.80; loss on ignition, 23.20; behavior during ignition, blackened and evolved disagreeable odor; mineral matter, 8.60.

October 5. Received four samples of water from Dr. R. A. Whitney, Liverpool. Ordered examined October 6. Analyzed and reported upon October 12.

November 7. Received sample of chocolate candy from Dr. A. T. Banning, health officer, Mount Vernon, supposed to have caused illness. Ordered examined same day. Examined and reported upon November 29 as follows:

ALBANY, *November* 29, 1904.

DR. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir.—On the 7th instant I received from you a sample of candy consisting of four chocolate cream confections which had been submitted for examination by Dr. A. T. Banning, health officer of the city of Mount Vernon, who stated that "two persons claimed to have been made sick on Saturday last from eat-

ing same, with vomiting, diarrhoea, pains in the legs, etc." In conformity with your instructions I have examined the candies but with negative results so far as the discovery of any deleterious constituent in the same is concerned.

The candies were contained in a pasteboard box, unsealed which had been sent through the mail. They were bar shaped, about 1¾ inches long by about 5-8 inch square, and weighed about 12 grams each. They were coated with chocolate which had a good appearance, odor and taste, and the interior filling was of a creamy color, firm consistence and contained fragments of cocoa-nut and other broken nuts. This filling was slowly soluble in cold, and more readily soluble in hot water, yielding a slightly turbid solution from which the fragments of nuts separated. It consisted largely of dextrose and contained a small amount of starch probably derived from the cocoanut present. There was no evidence of the presence of terra alba or other mineral filler. The chocolate coating was carefully examined for iron oxide, ferrocyanide of copper, and coal-tar browns, which are said to be employed sometimes in the manufacture of chocolate and chocolate confections, but with negative results, and since there was no other evidence of the presence of any harmful or deleterious constituent in either the filling or coating, I am of opinion that the illness complained of is to be attributed to some other cause than the candy unless eaten in inordinate quantity, in which case it may have given rise to a temporary disturbance of digestion.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

November 30. Received three samples of water from New Paltz by Mr. Peter Deyo, of Board of Tax Commissioners. Ordered examined same day. Analyzed and reported upon December 7.

December 17. Received sample of water from Prof. O. H. Landreth, C. E., Schenectady, for special examination as to mineral matter and hardness. Ordered examined same day. Analyzed and reported upon December 22.

December 29. Received sample of tincture of aconite from Dr. J. S. Purdy, health officer, Seneca Falls. Report on examination of same will be found in the succeeding annual report.

December 31. Received two samples of water from Dr. E. E. Eddy, health officer, Redwood. Subsequently examined and reports on same will be found in succeeding report.

WATER ANALYSES.

During the year 95 samples of water used for domestic purposes were received, analyzed and reported upon as above stated. The examination has included physical properties (color, turbidity, sediment and odor); chlorine; free and albuminoid ammonias; nitrogen in nitrites, and in nitrates; total solids; loss on ignition and behavior during ignition; mineral matter, and other special determinations, as oxygen absorbed, hardness, etc., if deemed necessary in particular cases. The results obtained have been deemed sufficient for determining fitness for domestic use in most instances. To all senders of samples the following printed instructions have been sent in advance, and in construing the results of the examination the information which has been furnished concerning source of sample, its surroundings and possible contaminations, has been given due weight in forming an opinion as to fitness for use, and this fact will explain why some waters have been condemned which, judged solely by the analytical data, might appear to be of satisfactory quality.

NEW YORK
STATE DEPARTMENT OF HEALTH
ALBANY
Chemical Analysis of Water

Directions for taking and forwarding samples of water

1. Use clean *glass* demijohns of gallon capacity. *Never use stone jugs.*
2. Rinse the demijohns thoroughly several times with the water before filling.
3. Fill with a fair sample of the water to be analyzed, and if dippers, funnels or other vessel are used, see to it that these are clean.
4. Close with a *new and clean cork* which should be well tied down with cord. The ends of the cord may be sealed, but top should not be coated with wax.
5. Accompany the sample with description of same, stating source, proximity of houses, stables, privies, cesspools, drains or other sources of possible contamination, and if from well, depth and character of soil. If several samples are sent state whether from same vicinity or same source, and describe fully, stating reasons for selection of the samples. All samples to be properly numbered or otherwise labelled for purpose of identification.
6. Forward without delay, *prepaying all charges*, to Prof. Willis G. Tucker, Director, Bureau of Chemistry, Albany Medical College, Albany, N. Y.
7. Make the addressed Tag or Marking secure.

The reports not having been elsewhere published are appended:

No. 738.

(Results are parts in 100,000.)

Received from Dr. O. J. Hallenbeck, health officer, Canandaigua; date received, December 30, 1900; source, Canandaigua

Lake; how labeled, "Canandaigua Lake intake." Appearance: Color, light greenish tint; turbidity, none; sediment, slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.30; free ammonia, 0.0055; albuminoid ammonia, 0.0100; nitrogen as nitrites, 0.0006; nitrogen as nitrates, 0.0344; total solids, 15.20; loss on ignition, 6.40; behavior during ignition, darkened; mineral matter, 8.80; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, January 8, 1904.

No. 739.

(Results are parts in 100,000.)

Received from Dr. O. J. Hallenbeck, health officer, Canandaigua; date received, December 30, 1903; source, Canandaigua Lake; how labeled, "Canandaigua Lake, *point*." Appearance: Color, light greenish tint; turbidity, none; sediment, slight. Odor at 100 degrees, F., very slight; chlorine in chlorides, 0.30; free ammonia, 0.0000; albuminoid ammonia, 0.0040; nitrogen as nitrites, 0.0006; nitrogen as nitrates, 0.0384; total solids, 16.80; loss on ignition, 6.20; behavior during ignition, darkened slightly; mineral matter, 10.60; remarks, contains traces of nitrites but is superior in most respects to other samples.

Dated at Bureau of Chemistry, January 8, 1904.

No. 740.

(Results are parts in 100,000.)

Received from Dr. O. J. Hallenbeck, health officer, Canandaigua; date received, December 30, 1903; source, Canandaigua Lake; how labeled, "Canandaigua Lake, *South*." Appearance: Color, light greenish tint; turbidity, none; sediment, slight; Odor at 100 degrees F., very slight; chlorine in chlorides, 0.30; free ammonia, 0.0015; albuminoid ammonia, 0.0050; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.0368; total solids, 15.60; loss on ignition, 6.40; behavior during ignition, darkened; mineral matter, 9.20; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, January 8, 1904.

No. 741.

(Results are parts in 100,000.)

Received from Dr. A. E. Wage, health officer, Albion; date received, January 5, 1904; source, no particulars stated; how labeled, "Taken from Albion Water Works Co." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 1.90; free ammonia, 0.0013; albuminoid ammonia, 0.0040; nitrogen in nitrites, 0.0000; nitrogen as nitrates, 0.3440; total solids, 35.80; loss on ignition, 13.60; behavior during ignition, no change; mineral matter, 22.20; remarks, satisfactory quality.

Dated at Bureau of Chemistry, January 12, 1904.

ALBANY, *January* 14, 1904.

DR. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany:*

Dear Sir.—I respectfully enclose herewith reports in duplicate on the analysis of three samples of water received by your order on the 8th inst., from Dr. J. C. Clark, health officer, Olean, N. Y.

Sample No. 742, marked "Refinery well," resembles the other samples closely in some respects, but it contains nitrites and is, in other respects, inferior to them. Its odor is peculiar and suggestive of gasoline, and the water is decidedly softer than the other samples although the mineral matter is not very much less.

Samples Nos. 743 and 744 do not differ very materially. They are somewhat hard, though not sufficiently so to render them unsuitable for ordinary household uses, manufacturing purposes or employment in boilers, and show no evidences of objectionable pollution. They deserve to be rated as of excellent quality.

I am informed by Dr. Pearce that he has examined these waters and finds them of satisfactory quality from the bacteriological standpoint.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

No. 742.

(Results are parts in 100,000.)

Received from Dr. J. C. Clark, health officer, Olean; date received, January 8, 1904; source, "Drilled well, 300 feet deep;"

how labeled, "No. 1, Refinery well." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., slight; chlorine in chlorides, 1.60; free ammonia, 0.0045; albuminoid ammonia, 0.0020; nitrogen as nitrites, 0.0031; nitrogen as nitrates, 0.0000; total solids, 25.60; loss on ignition, 3.40; behavior during ignition, no change; mineral matter, 22.20; total hardness, 8.00; ditto equivalent to grains carbonate lime per U. S. gallon, 4.67; remarks, contains nitrites and is inferior to No. 743 and No. 744.

Dated at Bureau of Chemistry, January 14, 1904.

No. 743.

(Results are parts in 100,000.)

Received from Dr. J. C. Clark, health officer, Olean; date received, January 8, 1904; source, "Drilled well, 294 feet deep;" how labeled, "No. 2, Pierce well." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees, F, none; chlorine in chlorides, 1.60; free ammonia, 0.0005; albuminoid ammonia, 0.0030; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.1248; total solids, 33.20; loss on ignition, 7.40; behavior during ignition, no change; mineral matter, 25.80; total hardness, 14.21; ditto equivalent to grains carbonate lime per U. S. gallon, 8.29; remarks, this is an excellent water although somewhat hard.

Dated at Bureau of Chemistry, January 14, 1904.

No. 744.

(Results are parts in 100,000.)

Received from Dr. J. C. Clark, health officer, Olean; date received, January 8, 1904; source, "City water—wells 30 to 40 feet deep," how labeled, "No. 3, Olean city water." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 2.20; free ammonia, 0.0005; albuminoid ammonia, 0.0020; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0556; total solids, 29.20; loss on ignition,

4.80; behavior during ignition, no change; mineral matter, 24.40; total hardness, 13.91; ditto equivalent to grains carbonate lime per U. S. gallon, 8.11; remarks, this is an excellent water but somewhat hard.

Dated at Bureau of Chemistry, January 14, 1904.

ALBANY, *February* 3, 1904.

DR. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany:*

Dear Sir.—I respectfully enclose herewith report in duplicate on the analysis of a sample of well water received on the 29th ultimo by your order from Dr. D. T. Condict, health officer, Goshen, N. Y. While the free ammonia is not high, and nitrites are absent, the water nevertheless shows evidence of distinct pollution. Such water may at any time become specifically contaminated, and although I am informed by the Bender Laboratory that they find this water satisfactory it certainly cannot be commended from a chemical standpoint. The source of the sample was fully described by the health officer in his letter accompanying it. It is a very old and comparatively shallow well and so situated as to be liable to pollution. Such pollution is indicated by the chemical examination and if the fact that the use of this water has been frequently suspected to have caused disease be taken into consideration I think we are entirely justified in recommending that its use for domestic purposes be discontinued.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 745.

(Results are parts in 100,000.)

Received from Dr. D. T. Condict, health officer, Goshen; date received, January 29, 1904; source, well; how labeled, none. Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 2.70; free ammonia, 0.0035; albumionid ammonia, 0.0125; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 1.0520; total rides, 2.70; free ammonia, 0.0035; albuminoid ammonia, 0.0125; blackened; mineral matter, 28.60; remarks, unsatisfactory quality; advise that its use be discontinued for domestic purposes.

Dated at Bureau of Chemistry, February 3, 1904.

ALBANY, *February* 10, 1904.

DR. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany:*

Dear Sir.—I respectfully enclose herewith reports in duplicate on the analysis of a sample of water received on the 4th inst., from Dr. H. C. Finch, health officer, Broadalbin, N. Y., and described by him in a letter accompanying the sample and dated February 2. He writes that he found a sugar sack tied over the pump spout to serve as a strainer and the water evidently contains foreign matter and probably sugar. In any case, in its present condition it is unfit for domestic use. According to Dr. Finch's description the well is badly located and the use of the water is thought to have caused illness. It is recommended that its further employment for drinking and domestic purposes be discontinued.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

No. 746.

(Results are parts in 100,000.)

Received from Dr. H. C. Finch, health officer, Broadalbin; date received, February 4, 1904; source, well; how labeled, "From Dr. Finch." Appearance: Color, greenish tint; turbidity, decided; sediment, slight. Odor at 100 degrees F., slight; chlorine in chlorides, 1.10; free ammonia, 0.0045; albuminoid ammonia, 0.0105; nitrogen as nitrites, 0.0022; nitrogen as nitrates, 0.7680; total solids, 36.20; loss on ignition, 24.60; behavior during ignition, strong blackening, odor of burning sugar; mineral matter, 11.60; remarks, unfit for domestic use.

Dated at the Bureau of Chemistry, February 10, 1904.

No. 747.

(Results are parts in 100,000.)

Received from Dr. S. A. Wessels, health officer, Canajoharie; date received, February 12, 1904; source, public water supply of Canajoharie; how labeled, "From S. A. Wessels." Appearance: Color, light greenish tint; turbidity, decided; sediment, slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.70; free am-

monia, 0.0015; albuminoid ammonia, 0.0060; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.1176; total solids, 31.40; loss on ignition, 8.20; behavior during ignition, no change; mineral matter, 23.20; remarks, satisfactory quality.

Dated at Bureau of Chemistry, February 17, 1904.

No. 748.

(Results are parts in 100,000.)

Received from Dr. S. A. Wessels, health officer, Canajoharie; date received, February 12, 1904; source, well, used by Miles Diefendorf; how labeled, "Water sample No. 2." Appearance: Color, light greenish tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 3.30; free ammonia, 0.0010; albuminoid ammonia, 0.0050; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3332; total solids, 53.40; loss on ignition, 17.20; behavior during ignition, no change; mineral matter, 36.20; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, February 17, 1904.

ALBANY, *February* 23, 1904.

DR. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany:*

Dear Sir.—I respectfully enclose herewith reports in duplicate on the analysis of four samples of water received by your order on the 16th instant from Watertown, and sent by Professor Olin H. Landreth, C. E.

Samples Nos. 749 and 752 resemble each other quite closely: While they are not entirely satisfactory the analytical results, in themselves, do not justify their condemnation. I am not informed as to the present condition of the river, nor concerning the location and surroundings of the intake, but it is probable that, from a chemical standpoint, the water is at its best, or near it, at this season. The fact, however, should not be lost sight of that waters may become specifically polluted and capable of conveying the germs of disease like typhoid fever although their chemical character may not be materially altered, and that this is especially true in the case of surface waters where the proportion of sewage

added to the stream, or other body of water, is comparatively small.

Samples Nos. 750 and 751, both from wells, present decided differences. Aside from the chlorine, which is high, No. 750 is of satisfactory quality. In No. 751 the chlorine, nitrates and total solids are all high and this water cannot be recommended for domestic use.

I am informed by the Director of the Bureau of Pathology and Bacteriology that his examination of these waters indicates objectionable pollution in the intake and Knowlton samples, and, taking all the facts into consideration, and under the conditions now existing at Watertown, it would, in my judgment, be advisable to recommend that so much of the city water as, in each household, is used for drinking, be thoroughly boiled during the continuance of the present epidemic at least.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

No. 749.

(Results are parts in 100,000.)

Received from Watertown, by Prof. O. H. Landreth; date received, February 16, 1904; source, "Intake of Watertown waterworks;" how labeled, "No. 1." Appearance: Color, brownish-yellow tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., very slight, earthy; chlorine in chlorides, 0.15; free ammonia, 0.0020; albumonoid ammonia, 0.0075; nitrogen in nitrites, 0.0000; nitrogen as nitrates, 0.0296; total solids, 5.40; loss on ignition, 4.20; behavior during ignition, blackened; mineral matter, 1.20; remarks, from a chemical standpoint cannot be condemned.

Dated at Bureau of Chemistry, February 23, 1904.

No. 750.

(Results are parts in 100,000.)

Received from Watertown by Prof. O. H. Landreth; date received, February 16, 1904; source, "Knowlton Bros. mill, well." how labeled, "No. 2." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 5.10; free ammonia, 0.0005; albuminoid

ammonia, 0.0025; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 37.20; loss on ignition, 11.80; behavior during ignition, no change; mineral matter, 25.40; remarks, chlorine high, but cannot be condemned from a chemical standpoint.

Dated at Bureau of Chemistry, February 23, 1904.

No. 751.

(Results are parts in 100,000.)

Received from Watertown by Prof. O. H. Landreth; date received, February 16, 1904; source, "Well of Remington block, Watertown"; how labeled, "No. 3." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 5.40; free ammonia, 0.0000; albuminoid ammonia, 0.0035; nitrogen as nitrites. 0.0000; nitrogen as nitrates, 1.9040; total solids, 84.80; loss on ignition, 14.40; behavior during ignition, no change; mineral matter, 70.40; remarks, cannot be recommended for domestic use.

Dated at Bureau of Chemistry, February 23, 1904.

No. 752.

(Results are parts in 100,000.)

Received from Watertown by Prof. O. H. Landreth; date received, February 16, 1904; source, 20 Hawk street, Watertown; how labeled, "No. 4, 20 Hawk street, Watertown." Appearance: Color, brownish-yellow tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., very slight, earthy; chlorine in chlorides, 0.15; free ammonia, 0.0005; albuminoid ammonia, 0.0075; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0384; total solids, 6.40; loss on ignition, 2.20; behavior during ignition, blackened; mineral matter, 4.20; remarks, from a chemical standpoint it cannot be condemned.

Dated at Bureau of Chemistry, February 23, 1904.

No. 753.

(Results are parts in 100,000.)

Received from office of State Comptroller; date received, February 19, 1904. Appearance: Color, none; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.50; free ammonia, 0.0000; albuminoid ammonia, 0.0000; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.1052; total solids, 13.60; loss on ignition, 4.20; behavior on ignition, no change; mineral matter, 9.40; remarks, good quality.

Dated at Bureau of Chemistry, February 25, 1904.

No. 754.

(Results are parts in 100,000.)

Received from Dr. A. A. Young, Newark, by direction of Dr. G. H. Craft, health officer, Newark; date received, March 9, 1904; source, from well of Peter Van Male, near Port Gibson; how labeled, none. Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 1.90; free ammonia, 0.0025; albuminoid ammonia, 0.0120; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.7400; total solids, 40.60; loss on ignition, 9.20; behavior during ignition, darkened; mineral matter, 31.40; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, March 16, 1904.

No. 755.

(Results are parts in 100,000.)

Received from Dr. J. T. Horton, health officer, Hammondsport; date received, March 26, 1904; source, service pipe in village supply; how labeled, "From Hammondsport village health officer." Appearance: Color, greenish-yellow tint; turbidity, decided; sediment, slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.30; free ammonia, 0.0120; albuminoid ammonia, 0.0145; nitrogen as nitrites, 0.0012; nitrogen as nitrates, 0.0768; total solids,

14.20; loss on ignition, 3.60; behavior during ignition, darkened; mineral matter, 10.60; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, April 5, 1904.

No. 756.

(Results are parts in 100,000.)

Received from Rome State Custodial Asylum, Rome; date received, March 26, 1904; source, filtered water supplying institution; how labeled, "From Rome State Custodial Asylum." Appearance: Color, greenish-yellow tint; turbidity, decided; sediment, very slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.15; free ammonia, 0.0013; albuminoid ammonia, 0.0070; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 8.20; loss on ignition, 1.80; behavior during ignition, darkened slightly; mineral matter, 6.40; remarks, satisfactory quality.

Dated at Bureau of Chemistry, April 5, 1904.

ALBANY, *April* 22, 1904.

DR. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir.—I respectfully enclose herewith reports in duplicate on the analysis of two samples of water received by your order on the 16th instant from J. J. R. Croes, C. E., and forwarded by him from Tarrytown, N. Y. No. 757 was marked "Water from lower lake," and No. 758, "Water from pump."

The waters were quite similar, although that from the pump (No. 758) is the better. Their appearance is fairly satisfactory for surface waters; nitrites are absent; nitrates low; ammonias and oxygen absorbed are low in No. 758 and fairly low in No. 757 for surface waters. Total solids are low, and they are soft waters.

While the water from the pump is superior to the other sample, they neither of them show the presence of harmful pollution, and, judged by our ordinarily accepted standards for waters of their class, they are of satisfactory quality and not to be condemned on chemical grounds.

I am informed by the Director of the Bureau of Bacteriology that he has examined these waters and finds them satisfactory.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 757.

(Results are parts in 100,000.)

Received from J. J. R. Croes, civil engineer, Tarrytown; date received, April 16, 1904; source, water from lower lake; how labeled, "From Tarrytown, water from lower lake." Appearance: Color, greenish-yellow tint; turbidity, distinct; sediment, very slight. Odor at 100 degrees F., very slight; chlorine in chlorides, 0.40; free ammonia, 0.0045; albuminoid ammonia, 0.0185; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0172; oxygen consumed, 0.2215; total solids, 4.20; loss on ignition, 2.40; behavior during ignition, blackened; mineral matter, 1.80; total hardness, 2.86; ditto, equivalent to grains carbonate lime per U. S. gallon, 1.67; remarks, satisfactory quality for surface water, but inferior to No. 758.

Dated at Bureau of Chemistry, April 22, 1904.

No. 758.

(Results are parts in 100,000.)

Received from J. J. R. Croes, civil engineer, Tarrytown; date received, April 16, 1904; source, water from pump; how labeled, "From Tarrytown, water from pump." Appearance: Color, greenish-yellow tint; turbidity, slight; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 0.40; free ammonia, 0.0025; albuminoid ammonia, 0.0075; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0176; oxygen consumed, 0.1415; total solids, 3.40; loss on ignition, 1.80; behavior during ignition, blackened; mineral matter, 1.60; total hardness, 2.73; ditto, equivalent to grains carbonate lime per U. S. gallon, 1.59; remarks, satisfactory quality for surface water and superior to No. 757.

Dated at Bureau of Chemistry, April 22, 1904.

No. 759.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at 19 Elm street; how labeled, "Sample A." Appearance: Color, light greenish tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 6.30; free ammonia, 0.0010; albuminoid ammonia, 0.0085; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3332; total solids, 47.80; loss on ignition, 12.20; behavior during ignition, darkened slightly; mineral matter, 35.60; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, May 5, 1904.

No. 760.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at 31 William street; how labeled, "Sample B." Appearance: Color, yellowish; turbidity, none; sediment, trifling. Odor at 100 degrees F., slight; chlorine in chlorides, 8.30; free ammonia, 0.0040; albuminoid ammonia, 0.0230; nitrogen as nitrites, 0.0222; nitrogen as nitrates, 0.6240; total solids, 65.60; loss on ignition, 23.40; behavior during ignition, blackened; mineral matter, 42.20; remarks, unsatisfactory quality; advise to discontinue use.

Dated at Bureau of Chemistry, May 5, 1904.

No. 761.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at corner of William and Sherman streets; how labeled, "Sample C." Appearance: Color, light greenish tint; turbidity, none; sediment, slight brownish. Odor at 100 degrees F., none; chlorine in chlorides, 10.60; free ammonia, 0.1165; albuminoid ammonia, 0.0120; nitrogen as nitrites,

0.2350; nitrogen as nitrates, 0.2856; total solids, 99.40; loss on ignition, 15.40; behavior during ignition, darkened slightly; mineral matter, 84.00; remarks, highly unsatisfactory and unfit for use.

Dated at Bureau of Chemistry, May 5, 1904.

No. 762.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at 45 William street; how labeled, "Sample D." Appearance: Color, greenish-yellow tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 3.30; free ammonia, 0.0000; albuminoid ammonia, 0.0075; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.1668; total solids, 52.60; loss on ignition, 10.40; behavior during ignition, blackened; mineral matter, 42.20; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, May 5, 1904.

No. 763.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at 67 West Elm street; how labeled, "Sample E." Appearance: Color, greenish-yellow tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 8.60; free ammonia, 0.0000; albuminoid ammonia, 0.0140; nitrogen as nitrites, 0.0021; nitrogen as nitrates, 1.1120; total solids, 84.60; loss on ignition, 14.80; behavior during ignition, blackened; mineral matter, 69.80; remarks, not satisfactory; advise to discontinue use.

Dated at Bureau of Chemistry, May 5, 1904.

No. 764.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at 82 West Elm street; how labeled, "Sample F." Appearance: Color, light greenish tint; turbidity, none; sediment, slight brownish. Odor at 100 degrees F., none; chlorine in chlorides, 5.60; free ammonia, 0.0005; albuminoid ammonia, 0.0140; nitrogen as nitrites, 0.0118; nitrogen as nitrates, 1.6680; total solids, 82.20; loss on ignition, 10.60; behavior during ignition, blackened; mineral matter, 71.60; remarks, unsatisfactory quality; advise to discontinue use.

Dated at Bureau of Chemistry, May 5, 1904.

No. 765.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at 3 North street; how labeled, "Sample G." Appearance: Color, light brownish tint; turbidity, slight; sediment, considerable. Odor at 100 degrees F., disagreeable; chlorine in chlorides, 5.20; free ammonia, 0.2350; albuminoid ammonia, 0.0180; nitrogen as nitrites, 0.0333; nitrogen as nitrates, 0.0832; total solids, 40.80; loss on ignition, 8.20; behavior during ignition, blackened; mineral matter, 32.60; remarks, unsatisfactory quality and unfit for use.

Dated at Bureau of Chemistry, May 5, 1904.

No. 766.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, April 16, 1904; source, well at 91 Lake street; how labeled, "Sample H." Appearance: Color, brownish tint; turbidity, none; sediment, considerable. Odor at 100 degrees F., none; chlorine in chlorides, 1.90; free ammonia, 0.4010; albu-

minoid ammonia, 0.0245; nitrogen as nitrites, 0.0030; nitrogen as nitrates, 0.0908; total solids, 31.60; loss on ignition, 12.40; behavior during ignition, blackened; mineral matter, 19.20; remarks, unsatisfactory quality; advise to discontinue.

Dated at Bureau of Chemistry, May 5, 1904.

No. 767.

(Results are parts in 100,000.)

Received from Dr. J. L. Hanmer, health officer, Middletown; date received, April 25, 1904; source, well; how labeled, "Benjamin." Appearance: Color, greenish yellow; turbidity, decided; sediment, slight; reaction, acid, actively fermenting. Odor, highly offensive; chlorine in chlorides, 19.80; total solids, 1024.60; loss on ignition, 895.80; behavior during ignition, strong blackening odor of burnt sugar; mineral matter, 128.80; remarks, unfit for use.

Dated at Bureau of Chemistry, May 7, 1904.

No. 768.

(Results are parts in 100,000.)

Received from J. J. R. Croes, State Hospital, Rochester; date received, April 27, 1904; source, bored well, 62 feet deep; how labeled, "From Brighton well, Rochester State Hospital." Appearance: Color, none; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 1.40; free ammonia, 0.0005; albuminoid ammonia, 0.0055; nitrogen as nitrites, 0.0011; nitrogen as nitrates, 0.0524; total solids, 35.60; loss on ignition, 6.40; behavior during ignition, no change; mineral matter, 29.20; total hardness, 27.82; ditto, equivalent to grains carbonate lime per U. S. gallon, 16.23; permanent hardness, 20.90; ditto, equivalent to grains carbonate lime per U. S. gallon, 12.19; remarks, aside from its hardness, is excellent water.

Dated at Bureau of Chemistry, May 7, 1904.

No. 769.

(Results are parts in 100,000.)

Received from J. J. R. Croes, State Custodial Asylum, Newark; date received, April 27, 1904; source, spring; how labeled, "From the Eben Lake spring, Newark." Appearance: Color, none; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.60; free ammonia, 0.0000; albuminoid ammonia, 0.0000; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0952; total solids, 96.20; loss on ignition, 17.80; behavior during ignition, no change; mineral matter, 78.40; total hardness, 65.05; ditto, equivalent to grains carbonate lime per U. S. gallon, 37.96; permanent hardness, 36.45; ditto, equivalent to grains carbonate lime per U. S. gallon, 21.26; remarks, much harder than No. 768, but otherwise it is a remarkably pure water.

Dated at Bureau of Chemistry, May 7, 1904.

No. 770.

(Results are parts in 100,000.)

Received from M. E. Kenyon, secretary, board of health, Moravia; date received, May 6, 1904; source, well; how labeled, "From board of health, Moravia, marked M." Appearance: Color, light greenish tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 0.40; free ammonia, 0.0020; albuminoid ammonia, 0.0105; nitrogen as nitrites, 0.0018; nitrogen as nitrates, 0.1668; total solids, 18.80; loss on ignition, 5.60; behavior during ignition, darkened slightly; mineral matter, 13.20; remarks, shows evidence of contamination.

Dated at Bureau of Chemistry, May 14, 1904.

ALBANY, *May* 23, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analysis of three samples of water received by your order on the 17th instant from Dr. Arnold E. Wage, health officer, Albion, N. Y.

These samples were sent by and with the advice of Mr. J. J. R. Croes, C. E., as I am informed. As stated in the reports, the sample taken from the present public supply is of good quality, while that from Otter creek is not very satisfactory, and that from the Erie canal is quite unfit for domestic use. I am informed by the Director of the Bureau of Pathology and Bacteriology that samples of water from Otter creek and the present supply, which I infer correspond to samples Nos. 771 and 772, now reported upon, have been examined by him and found of satisfactory quality.

Very respectfully,
WILLIS G. TUCKER,
Director.

No. 771.

(Results are parts in 100,000.)

Received from Dr. Arnold E. Wage, health officer, Albion; date received, May 17, 1904; source, Otter creek, proposed source of supply for village; how labeled, "Water taken May 13 from Otter creek." Appearance: Color, decided yellowish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.70; free ammonia, 0.0045; albuminoid ammonia, 0.0315; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.0384; total solids, 34.20; loss on ignition, 10.40; behavior during ignition, blackened; mineral matter, 23.80; remarks, not very satisfactory quality.

Dated at Board of Chemistry, May 23, 1904.

No. 772.

(Results are parts in 100,000.)

Received from Dr. Arnold E. Wage, health officer, Albion; date received, May 17, 1904; source, present water supply of village; how labeled, "Water taken from Albion Waterworks Co.'s plant, May 14, 1904." Appearance: Color, nearly colorless; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 1.40; free ammonia, 0.0005; albuminoid ammonia,

0.0020; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3240; total solids, 25.60; loss on ignition, 9.40; behavior during ignition, no change; mineral matter, 16.20; remarks, good quality, and much superior to either of the other samples accompanying it.

Dated at Bureau of Chemistry, May 23, 1904.

No. 773.

(Results are parts in 100,000.)

Received from Dr. Arnold E. Wage, health officer, Albion; date received, May 17, 1904; source, Erie canal at Albion; how labeled, "Water taken from Erie canal where pipe is connected with Albion waterworks." Appearance: Color, light brownish tint; turbidity, distinct; sediment, slight. Odor at 100 degrees F., none; chlorine in chlorides, 1.30; free ammonia, 0.0160; albuminoid ammonia, 0.0140; nitrogen as nitrites, 0.0036; nitrogen as nitrates, 0.0212; total solids, 20.80; loss on ignition, 8.20; behavior during ignition, blackened; mineral matter, 12.60; remarks, unsatisfactory quality and unfit for domestic use.

Dated at Bureau of Chemistry, May 23, 1904.

No. 774.

(Results are parts in 100,000.)

Received from Dr. W. H. Snyder, health officer, Newburgh; date received, May 25, 1904; source, well; how labeled, "Water from Dr. Snyder, health officer, Newburgh." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 4.30; free ammonia, 0.0100; albuminoid ammonia, 0.0135; nitrogen as nitrites, 0.0160; nitrogen as nitrates, 0.3560; total solids, 47.60; loss on ignition, 11.20; behavior during ignition, darkened slightly; mineral matter, 36.40; remarks, unsatisfactory quality.

Dated at Bureau of Chemistry, May 27, 1904.

No. 775.

(Results are parts in 100,000.)

Received from State Department of Health, per H. C. Gott; date received, June 21, 1904; source, not stated; label, none. Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.10; free ammonia, 0.0005; albuminoid ammonia, 0.0065; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0116; total solids, 16.80; loss on ignition, 3.60; behavior during ignition, darkened slightly; mineral matter, 13.20; remarks, good quality.

Dated Bureau of Chemistry, June 22, 1904.

Albany, *June* 27, 1904.

Dr. Daniel Lewis, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analyses of four samples of water received by your order on the 21st inst. from Mr. A. M. Patterson, for the committee on sewers and water of Waterloo, N. Y., and by request of J. J. R. Croes, C. E. It seemed desirable in these instances to include the determination of "oxygen consumed," which adds valuable information.

These waters present certain peculiarities. The chlorine in the Seneca river and Seneca lake samples is high and may possibly be accounted for by geographical position and geological relations. Nitrites are also present in these samples, but otherwise the results do not indicate objectionable sewage pollution except in case of sample No. 776, which is by no means satisfactory and should be condemned. The Phillips pond sample is quite different from the others, and while such a water might not prove satisfactory as a source of supply, its contamination is evidently due to the presence of decaying vegetable matter. I have consulted with Dr. Pearce as to results of his bacteriological examination of these samples, and they would seem to be quite in agreement with the results of the chemical examination.

Very respectfully yours,

WILLIS G. TUCKER.

Director.

No. 776.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, request of J. J. R. Croes; date received, June 21, 1904; source, "Seneca river, Waterloo, waterworks intake basin;" how labeled, "A." Appearance: Color, yellowish-green tint; turbidity, none; sediment, slight. Odor at 100 degrees F., slight; chlorine in chlorides, 4.80; free ammonia, 0.0165; albuminoid ammonia, 0.0120; nitrogen as nitrites, 0.0011; nitrogen as nitrates, 0.0208; oxygen consumed, 0.1965; total solids, 22.60; loss on ignition, 5.20; behavior during ignition, darkened; mineral matter, 17.40; remarks, not satisfactory.

Dated at Bureau of Chemistry, June 27, 1904.

No. 777.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, request of J. J. R. Croes; date received, June 21, 1904; source, "Seneca river, guard gate at inlet from Seneca lake;" how labeled, "B." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 4.80; free ammonia, 0.0005; albuminoid ammonia, 0.0030; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.0232; oxygen consumed, 0.1315; total solids, 20.80; loss on ignition, 4.20; behavior during ignition, darkened slightly; mineral matter, 16.60; remarks, aside from chlorine and nitrites is satisfactory.

Dated at Bureau of Chemistry, June 27, 1904.

No. 778.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, request of J. J. R. Croes; date received, June 21, 1904; source, "Seneca lake, two miles south of inlet to Seneca river;" how labeled, "C." Appearance: Color, light greenish tint; turbidity, none; sediment, none.

Odor at 100 degrees, F., none; chlorine in chlorides, 4.70; free ammonia, 0.0005; albuminoid ammonia, 0.0040; nitrogen as nitrites, 0.0004; nitrogen as nitrates, 0.0272; oxygen consumed, 0.1165; total solids, 20.80; loss on ignition, 4.40; behavior during ignition, darkened slightly; mineral matter, 16.40; remarks, aside from chlorine and nitrites is satisfactory.

Dated at Bureau of Chemistry, June 27, 1904.

No. 779.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, request of J. J. R. Croes; date received, June 21, 1904; source, "Phillips pond, Seneca county;" how labeled, "D." Appearance: Color, decided greenish-yellow tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 0.10; free ammonia, 0.0005; albuminoid ammonia, 0.0130; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; oxygen consumed, 0.6165; total solids, 17.40; loss on ignition, 6.80; behavior during ignition, blackened; mineral matter, 10.60; remarks, fairly satisfactory for a pond water; results indicate vegetable pollution.

Dated at Bureau of Chemistry, June 27, 1904.

ALBANY, *July* 8, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analysis of two samples of water from the village supply of Mohawk received by your order on June 30, 1904, from Dr. William Landt, Health Officer, Mohawk, N. Y. Dr. Landt, in a letter accompanying the samples and dated June 29, 1904, states that the source of the water is in a spring or well. Neither of the samples is of very satisfactory quality as judged by ordinary

standards for unpolluted spring waters. Both contain nitrites, and in sample No. 781 they are suspiciously high. I am informed by the Bureau of Pathology that a bacteriological examination of these samples gives unsatisfactory results and, taking all the facts so far as known to me into consideration, I should advise that caution be observed in the use of this water, and that an examination be made with a view to determining the source of the pollution of the supply.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 780.

(Results are parts in 100,000.)

Received from Dr. William Landt, health officer, Mohawk; date received, June 30, 1904; source, village supply, spring water; how labeled, "No. 1." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 0.60; free ammonia, 0.0075; albuminoid ammonia, 0.0085; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.1248; total solids, 27.20; loss on ignition, 4.40; behavior during ignition, no change; mineral matter, 22.80; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, July 8, 1904.

No. 781.

(Results are parts in 100,000.)

Received from Dr. William Landt, health officer, Mohawk; date received, June 30, 1904; source, village supply, end of a main; how labeled, "No. 2." Appearance: Color, greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees, F., slight; chlorine in chlorides, 0.60; free ammonia, 0.0005; albuminoid ammonia, 0.0050; nitrogen as nitrites, 0.0029; nitrogen as nitrates, 0.1536; total solids, 26.80; loss on ignition, 4.20; behavior during ignition, no change; mineral matter, 22.60; remarks, not satisfactory.

Dated at Bureau of Chemistry, July 8, 1904.

Albany, *July* 16, 1904.

Dr. Daniel Lewis, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analysis of ten samples of well waters received by your order on the 30th of June last from Dr. W. T. Tanner, health officer, Oneida, N. Y.

These waters show very marked differences, but all of them show more or less evidence of pollution by infiltration from sewage polluted soil. Four or five of these waters might be passed as fairly satisfactory, while the others are quite unfit for use; but none of them can be considered as above suspicion, and such wells as these may at any time become specifically polluted and serve as carriers of disease. Full particulars concerning each sample will be found in the individual reports.

Very respectfully yours,
WILLIS G. TUCKER.
Director.

No. 782.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample J." Appearance: Color, greenish tint; turbidity, none, sediment, very slight. Odor at 100 degrees, F., none; chlorine in chlorides, 0.80; free ammonia, 0.0020; albuminoid ammonia, 0.0045; nitrogen as nitrites, 0.0045; nitrogen as nitrates, 0.1176; total solids, 39.20; loss on ignition, 8.40; behavior during ignition, no change; mineral matter, 30.80; remarks, not satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

No. 783.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample K."

Appearance: Color, light greenish tint; turbidity, very slight; sediment, slight. Odor at 100 degrees F., none; chlorine in chlorides, 2.40; free ammonia, 0.0005; albuminoid ammonia, 0.0030; nitrogen as nitrites, 0.0004; nitrogen as nitrates, 1.3320; total solids, 70.20; loss on ignition, 20.60; behavior during ignition, no change; mineral matter, 49.60; remarks, not satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

No. 784.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample L." Appearance: Color, greenish tint; turbidity, distinct; sediment, considerable. Odor at 100 degrees F., slight; chlorine in chlorides, 3.60; free ammonia, 0.0050; albuminoid ammonia, 0.0095; nitrogen as nitrites, 0.1250; nitrogen as nitrates, 1.8160; total solids, 127.20; loss on ignition, 77.40; behavior during ignition, strong blackening, odor of burnt sugar; mineral matter, 49.80; remarks, entirely unfit for domestic use.

Dated at Bureau of Chemistry, July 16, 1904.

No. 785.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample M." Appearance: Color, greenish-yellow tint; turbidity, very slight; sediment, considerable. Odor at 100 degrees F., none; chlorine in chlorides, 2.80; free ammonia, 0.0013; albuminoid ammonia, 0.0140; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.8680; total solids, 56.20; loss on ignition, 8.40; behavior during ignition, blackened; mineral matter, 47.80; remarks, not very satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

No. 786.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample N." Appearance: Color, greenish-yellow tint; turbidity, distinct; sediment, considerable. Odor at 100 degrees F., none; chlorine in chlorides, 1.10; free ammonia, 0.0005; albuminoid ammonia, 0.0025; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0140; total solids, 31.80; loss on ignition, 7.20; behavior during ignition, no change; mineral matter, 24.60; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

No. 787.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample O." Appearance: Color, light greenish tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 1.80; free ammonia, 0.0013; albuminoid ammonia, 0.0055; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0120; total solids, 34.80; loss on ignition, 9.20; behavior during ignition, darkened; mineral matter, 25.60; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

No. 788.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well, how labeled, "Sample Z." Appearance: Color, greenish-yellow tint; turbidity, none; sediment, slight. Odor at 100 degrees F., none; chlorine in chlorides, 7.10; free ammonia, 0.0055; albuminoid ammonia, 0.0170; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0540; total solids, 70.80; loss on ignition, 11.20; behavior during ignition, blackened; mineral matter, 59.60; remarks, not satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

No. 789.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample Y." Appearance: Color, greenish tint; turbidity, very slight; sediment, considerable. Odor at 100 degrees, F., none; chlorine in chlorides, 6.30; free ammonia, 0.2110; albuminoid ammonia, 0.0235; nitrogen as nitrites, 0.2220; nitrogen as nitrates, 0.0952; total solids, 129.80; loss on ignition, 20.60; behavior during ignition, blackened; mineral matter, 109.20; remarks, unfit for domestic use.

Dated at Bureau of Chemistry, July 16, 1904.

No. 790.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample R." Appearance: Color, greenish-yellow tint; turbidity, slight; sediment, slight. Odor at 100 degrees F., very slight; chlorine in chlorides, 1.80; free ammonia, 0.0005; albuminoid ammonia, 0.0070; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 46.60; loss on ignition, 8.00; behavior during ignition, darkened; mineral matter, 38.60; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

No. 791.

(Results are parts in 100,000.)

Received from Dr. W. T. Tanner, health officer, Oneida; date received, June 30, 1904; source, well; how labeled, "Sample S." Appearance: Color, brownish tint; turbidity, slight; sediment, considerable. Odor at 100 degrees F., none; chlorine in chlorides, 9.10; free ammonia, 0.0005; albuminoid ammonia, 0.0070; nitro-

gen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 80.40; loss on ignition, 17.20; behavior during ignition, blackened; mineral matter, 63.20; remarks, not very satisfactory, although results are indicative of past rather than of recent pollution.

Dated at Bureau of Chemistry, July 16, 1904.

No. 792.

(Results are parts in 100,000.)

Received from Dr. Frank I. Smith, Barryville; date received, July 9, 1904; source, well of William Wilson, Eldred; how labeled, "From F. I. Smith, Barryville." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 1.20; free ammonia, 0.0045; albuminoid ammonia, 0.0070; nitrogen as nitrites, 0.0003; nitrogen as nitrates, 0.4320; total solids, 12.60; loss on ignition, 3.20; behavior during ignition, no change; mineral matter, 9.40; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, July 16, 1904.

ALBANY, *July* 20, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analysis of four samples of water received by your order on the 12th inst. from Waterloo, N. Y., by J. J. R. Croes, C. E.

The results, on the whole, are more satisfactory than those obtained on the analysis of three samples from same locality and reported upon June 27th last, although the differences are not very decided. Chlorine is high in all the samples, as in the last lot, and this must be due, I think, to the natural character of this water, since the other results do not indicate such sewage pollution as this might otherwise imply. It will be observed that nitrites which were present in the preceding samples from Seneca river and Seneca lake are absent in the samples now reported upon.

With the exception of sample No. 793, which is distinctly inferior to the other samples, these waters are of satisfactory quality. They present no very decided differences, although No. 795 is rather better than the others. I am informed by the Director of the Bureau of Pathology that he has made a bacteriological examination of these samples and finds them satisfactory, excepting sample from east side of lake, which he deems questionable.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

No. 793.

(Results are parts in 100,000.)

Received from J. J. R. Croes, Waterloo; date received, July 12, 1904; source, Waterloo pump station; how labeled, "A," Appearance: Color, greenish yellow tint; turbidity, distinct; sediment, slight. Odor at 100 degrees F., very slight; chlorine in chlorides, 4.60; free ammonia, 0.0195; albuminoid ammonia, 0.0130; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0168; oxygen consumed, 0.1765; total solids, 22.80; loss on ignition, 5.20; behavior during ignition, darkened; mineral matter, 17.60; remarks, not very satisfactory.

Dated at Bureau of Chemistry, July 20, 1904.

No. 794.

(Results are parts in 100,000.)

Received from J. J. R. Croes, Waterloo; date received, July 12, 1904; source, Seneca outlet, *above* junction with canal; how labeled, "B." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 4.60; free ammonia, 0.0045; albuminoid ammonia, 0.0080; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0236; oxygen consumed, 0.1065; total solids, 21.40; loss on ignition, 4.60; behavior during ignition, darkened; mineral matter, 16.80; remarks, satisfactory.

Dated at Bureau of Chemistry, July 20, 1904.

No. 795.

(Results are parts in 100,000.)

Received from J. J. R. Croes, Waterloo; date received, July 12, 1904; source, Seneca Lake, east side, 2 miles above outlet; how labeled, "C." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 4.70; free ammonia, 0.0005; albuminoid ammonia, 0.0025; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0308; oxygen consumed, 0.0965; total solids, 22.60; loss on ignition, 6.20; behavior during ignition, darkened slightly; mineral matter, 16.40; remarks, satisfactory.

Dated at Bureau of Chemistry, July 20, 1904.

No. 796.

(Results are parts in 100,000.)

Received from J. J. R. Croes, Waterloo; date received, July 12, 1904; source, Geneva pump station; how labeled, "D." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 4.70; free ammonia, 0.0013; albuminoid ammonia, 0.0060; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0268; oxygen consumed, 0.0915; total solids, 22.40; loss on ignition, 4.60; behavior during ignition, darkened slightly; mineral matter, 17.80; remarks, satisfactory.

Dated at Bureau of Chemistry, July 20, 1904.

No. 797.

(Results are parts in 100,000.)

Received from Peter Deyo, State Tax Commission; date received, July 14, 1904; source, well on premises of Perry Deyo, New Paltz; how labeled, "No. 1." Appearance: Color, light greenish tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., very slight; chlorine in chlorides, 1.20; free

ammonia, 0.0050; albuminoid ammonia, 0.0070; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3760; total solids, 37.40; loss on ignition, 8.20; behavior during ignition, no change; mineral matter, 29.20; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, July 25, 1904.

No. 798.

(Results are parts in 100,000.)

Received from Peter Deyo, State Tax Commission; date received, July 14, 1904; source, spring on premises of Perry Deyo, New Paltz; how labeled, "No. 2." Appearance: Color, nearly colorless; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 1.10; free ammonia, 0.0005; albuminoid ammonia, 0.0015; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3440; total solids, 28.40; loss on ignition, 6.60; behavior during ignition, no change; mineral matter, 21.80; remarks, excellent quality.

Dated at Bureau of Chemistry, July 25, 1904.

No. 799.

(Results are parts in 100,000.)

Received from M. E. Kenyon, secretary, board of health, Moravia; date received, July 15, 1904; source, spring, village supply; how labeled, "(K) From Board of Health, Moravia village." Appearance: Color, greenish-yellow tint; turbidity, slight; sediment, silght. Odor at 100 degrees F., slight; chlorine in chlorides, 0.15; free ammonia, 0.0015; albuminoid ammonia, 0.0060; nitrogen as nitrites, 0.0002; nitrogen as nitrates, 0.1112; total solids, 7.60; loss on ignition, 2.20; behavior during ignition, darkened slightly; mineral matter, 5.40; remarks, satisfactory quality.

Dated at Bureau of Chemistry, July 25, 1904.

No. 800.

(Results are parts in 100,000.)

Received from Dr. D. D. Daly, health officer, Ellenburgh Depot; date received, July 16, 1904; source, well; how labeled, none. Appearance: Color, greenish yellow tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., peculiar; chlorine in chlorides, 1.90; free ammonia, 0.0040; albuminoid ammonia, 0.0085; nitrogen as nitrites, 0.0122; nitrogen as nitrates, 0.0232; total solids, 28.60; loss on ignition, 7.40; behavior during ignition, darkened; mineral matter, 21.20; remarks, not satisfactory.

Dated at Bureau of Chemistry, July 26, 1904.

ALBANY, *July* 28, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith report in duplicate on the analysis of a sample of water received by your order on the 20th inst., from Dr. A. C. Aldrich, health officer, Lyons, N. Y. Concerning this water Dr. Aldrich writes: "This water is taken out of a creek, marshy in character and very muddy; is pumped into a well, side of creek; then into a stand-pipe and through village. It is claimed they pump it direct from creek and not filter it; well is a plugged salt well I believe. Creek gets all surface washings from marshy lands."

The results of the analysis sustain the health officer in the opinion which he evidently entertains since they indicate that the water is polluted and entirely unfit for domestic use. If within the authority of the health officer this supply should certainly be condemned.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 801.

(Results are parts in 100,000.)

Received from Dr. A. C. Aldrich, health officer, Lyons; date received, July 20, 1904; source, village supply, creek; how

labeled, "Lyons, N. Y., water from hydrant supply." Appearance: Color, deep greenish-yellow tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., very slight; chlorine in chlorides, 31.00; free ammonia, 0.0130; albuminoid ammonia, 0.0285; nitrogen as nitrites, 0.0036; nitrogen as nitrates, 0.0716; total solids, 111.20; loss on ignition, 24.80; behavior during ignition, blackened, some odor; mineral matter, 86.40; remarks, unfit for use.

Dated, Bureau of Chemistry, July 28, 1904.

ALBANY, *July* 28, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith report in duplicate on the analysis of a sample of water received on the 22nd inst., by by your order from Dr. D. C. Lowenstine, health officer, Rye, N. Y. This water is highly polluted and entirely unfit for any domestic use a fact which it would seem that the health officer might have determined with reasonable certainty. The water was also contaminated by being sent in a jug which had previously contained some syrup substance. If further samples are sent at any future time the health officer should strictly comply with our printed instruction governing such cases.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 802.

(Results are parts in 100,000.)

Received from Dr. D. C. Lowenstine, health officer, Rye; date received, July 22, 1904; source, pond, how labeled, "From Rye, N. Y." Appearance: Color, yellowish; turbidity, decided; sediment, considerable, including blackish scum. Odor, reaction acid, highly offensive; chlorine in chlorides, 5.10; total solids, 568.40; loss on ignition, 527.20; behavior during ignition, blackened, strong odor of burning sugar; mineral matter, 41.20; remarks, highly polluted and entirely unfit for any domestic use.

Dated, Bureau of Chemistry, July 28, 1904.

No. 803.

(Results are parts in 100,000.)

Received from Dr. Frederick S. Cole, health officer, Schroon Lake; date received, July 26, 1904; source, not stated; how labeled, "From Dr . F. S. Cole, H. O." Appearance: Color, deep brownish tint; turbidity, very slight; sediment, slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.10; free ammonia, 0.0110; albuminoid ammonia, 0.0065; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0140; total solids, 6.20; loss on ignition, 2.40; behavior during ignition, darkened; mineral matter, 3.80; remarks, not very satisfactory.

Dated at Bureau of Chemistry, July 29, 1904.

Albany, *August* 16, 1904.

Dr. Daniel Lewis, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analysis of four samples of water received by your order on the 4th inst., from Dr. O. J. Hallenbeck, health officer, Canandaigua, N. Y. Previous samples from Canandaigua Lake have been examined for him and reported upon in September, October and January last. These samples are not very different from those previously received.

No. 804 ("intake") is similar to sample similarly marked (No. 738) of January 8 though the albuminoid ammonia is higher.

No. 805 ("East") resembles sample similarly marked (No. 732) of October 23, 1903.

No. 806 ("South") is not so satisfactory as sample similarly marked (No. 740) of January 8 in that the ammonias are higher and nitrites decidedly higher.

No. 807 ("North") resembles sample similarly marked (No. 734) of October 23, 1903.

All of the samples contain nitrites and while otherwise of fair quality for surface water they cannot be considered as entirely satisfactory.

No information concerning the samples, other than that contained on the labels, has been furnished me.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 804.

(Results are parts in 100,000.)

Received from Dr. O. J. Hallenbeck, health officer, Canandaigua; date received, August 4, 1904; source, Canandaigua Lake; how labeled. "Canandaigua Lake, surface water, Intake." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.30; free ammonia, 0.0060; albuminoid ammonia, 0.0185; nitrogen as nitrites, 0.0006; nitrogen as nitrates, 0.0232; total solids, 14.40; loss on ignition, 4.80; behavior during ignition, blackened; mineral matter, 9 60; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, August 16, 1904.

No. 805.

(Results are parts in 100,000.)

Received from Dr. O. J. Hallenbeck, health officer, Canandaigua; date received, August 4, 1904; source, Canandaigua Lake; how labeled, "Canandaigua Lake, surface water, East." Appearance: Color, light yellowish-green tint; turbidity, very slight; sediment, slight. Odor at 100 degrees F., very slight; chlorine in chlorides, 0.30; free ammonia, 0.0040; albuminoid ammonia, 0.0110; nitrogen as nitrites, 0.0006; nitrogen as nitrates, 0.0264; total solids, 13.40; loss on ignition, 4.60; behavior during ignition, blackened; mineral matter, 8.80; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, August 16, 1904.

No. 806.

(Results are parts in 100,000.)

Received from Dr. O. J. Hallenbeck, health officer, Canandaigua; date received, August 4, 1904; source, Canandaigua Lake; how labeled, "Canandaigua Lake, surface water, South." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.40;

free ammonia, 0.0020; albuminoid ammonia, 0.0095; nitrogen as nitrites, 0.0017; nitrogen as nitrates, 0.0208; total solids, 14.40; loss on ignition, 4.80; behavior during ignition, blackened; mineral matter, 9.60; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, August 16, 1904.

No. 807.

(Results are parts in 100,000.)

Received from Dr. O. J. Hallenbeck, health officer, Canandaigua; date received, August 4, 1904; source, Canandaigua Lake; how labeled, "Canandaigua Lake, surface water, North." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.30; free ammonia, 0.0085; albuminoid ammonia, 0.0080; nitrogen as nitrites, 0.0006; nitrogen as nitrates, 0.0264; total solids, 14.20; loss on ignition, 3.80; behavior during ignition, blackened; mineral matter, 10.40; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, August 16, 1904.

Albany, *August* 16, 1904.

Dr. Daniel Lewis, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analysis of two samples of water from the public supply of Sidney, N. Y., taken by myself on the 10th inst. In conformity with your instructions I visited Sidney on that date and made such investigation of the water supply as time and circumstances would permit. Water is supplied to the village by the Sidney Water Works Company and from two sources, as I am informed. One is obtained from streams in the hills about two miles southeast of the village and delivered through pipes by gravity. Of this source of supply I made no inspection, but this water is said to have given satisfaction. The other supply is derived from a reservoir formed by damming the Guilford creek some three miles or thereabouts from the village and in a northerly direction. This water is also supplied through pipes by gravity and I am informed

that the arrangement of the piping and cut-offs is such that either supply may be turned on as desired, or different parts of the village supplied at will from either source.

The company has recently installed a filtering apparatus denominated the "Ideal System of Water Purification," and manufactured by the Pittsburg Filter Manufacturing Company, of Pittsburg, Pa. This is in connection with the Guilford creek supply and the apparatus is located in a substantially constructed building, built for the purpose, and situated about a mile below the reservoir. In company with Dr. J. V. E. Winnie, health officer, and Mr. S. F. De Cumber, a member of the board of health, I visited this filter plant, but found no one in charge of the same nor anything to indicate with certainty whether water was passing the filter and into the distributing mains. We, however, took samples of water both for chemical and for bacteriological examination from a penstock in the corner of the building, which was apparently connected with the filter and which the health officer told me was so connected, as he had been informed.

We then visited the reservoir on Guilford creek and found a good flow of water in the stream. Heavy rains had recently fallen and particularly during the preceding night and during the forenoon of the day on which our visit was made. The stream flows through a farming region, with fields on either side in which many cattle are pastured, and these have access to the stream, which receives the drainage of the fields. The village of Guilford, some five miles above, is said also to drain into the stream, but I made no particular inspection of the watershed, since this has already been done; but I observed various and evident sources of pollution. Thus, a farmhouse, near the bank of the creek and close to the reservoir, is so situated that its sewage and slops may readily flow over the surface, or leach through the soil, into the creek, and a single case of typhoid in this dwelling might contaminate the entire water supply, or so much of it, at least, as is derived from this creek. I was informed that it is asserted that this supply has not recently been generally used, but that after the recent placing of the filter the water was turned on for some weeks and until a day or so before my visit, but on these points I was unable to obtain positive information. The health officer informs me that diarrheal disorders have been exceedingly and unusually prevalent of late and are so at the present time, and I am informed that most of the inhabitants of the village use the public water supply.

Samples of water were taken both for chemical and for bacteriological examination from the reservoir, and these, together with the samples from the filter house, were immediately sent to Albany for examination.

From the enclosed reports it will be seen that the results of the chemical examination are fairly satisfactory. The water taken at the filter plant (No. 808) is, from a chemical standpoint, decidedly better than that taken from the reservoir, but I am unable to say whether this water actually passed the filter, and if so at what time and to what treatment subjected, or how long it may have lain in the main with which the penstock from which it was drawn is connected. I am informed by the Director of the Bureau of Pathology that the similar samples sent to him as above described have been examined and that the sample from the filter plant is of unsatisfactory, and that from the reservoir is of satisfactory quality. For this seeming discrepancy I am unable satisfactorily to account, but it is to be borne in mind that the water obtained at the filter may have been drawn from the reservoir some time prior to my visit, and perhaps before the very heavy rain of the preceding night and morning, so that it may have been different in character from that taken directly from the reservoir. And since there was no proof that the water was actually passing through the filter at the time of my visit, I think it would be advisable at some future time to secure further and carefully authenticated samples, both from the reservoir and from the filter as operated, and at a time, moreover, when the water in the creek is at a lower stage than at the time of my visit, as I am informed that it often is during the summer months.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 808.

(Results are parts in 100,000.)

Received from Sidney, N. Y.; date received, August 11, 1904; source, "Filter house, Guilford creek, 3:20 p. m., August 10, 1904;" how labeled, "No. 1." Appearance: Color, light greenish-yellow tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.20; free ammonia, 0.0005; albuminoid ammonia, 0.0070; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0068; total solids, 4.20; loss on ignition, 1.80; behavior during ignition, darkened; mineral matter, 2.40; remarks, satisfactory quality.

Dated at Bureau of Chemistry, August 16, 1904.

No. 809.

(Results are parts in 100,000.)

Received from Sidney, N. Y.; date received, August 11, 1904; source, "Guilford creek reservoir, 4 p. m., August 10, 1904;" how labeled, "No. 2." Appearance: Color, greenish-yellow tint; turbidity, very slight; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 0.20; free ammonia, 0.0085; albuminoid ammonia, 0.0110; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 5.20; loss on ignition, 2.00; behavior during ignition, darkened; mineral matter, 3.20; remarks, fairly satisfactory quality.

Dated at Bureau of Chemistry, August 16, 1904.

ALBANY, *August* 31, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analyses of five samples of water received by your order on the 19th inst. from Dr. D. C. Lowenstine, health officer, Rye, N. Y. They are described by him in his letter accompanying the samples, and dated August 17, 1904, as being samples of water supplied to the village of Rye by the Portchester Water Company. Concerning the lakes, or ponds, from which the supply is derived, he writes: "The surface of the ponds was quite clean and the banks and shores in condition," by which I understand him to mean that they were in good condition. He further states that the reason for sending the samples is "complaint as to odor and taste of the water."

The samples may all be passed as of satisfactory quality for waters of their class. The ammonias are fairly high in all the samples, and particularly in No. 810, but in the absence of other chemical evidences of pollution this is indicative of vegetable contamination rather than sewage pollution. General appearance of the samples is fairly good and odor not objectionable. Chlorine is low in all and nitrites absent. Such taste or odor as these waters may in summer time have are not, in themselves, to be considered as evidence of objectionable contamination.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 810.

(Results are parts in 100,000.)

Received from Dr. D. C. Lowenstine, health officer, Rye; date received, August 19, 1904; source, "Turner's drug store, Rye village;" how labeled, "1." Appearance: Color, light greenish tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.30; free ammonia, 0.0065; albuminoid ammonia, 0.0210; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 4.80; loss on ignition, 2.40; behavior during ignition, blackened; mineral matter, 2.40; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

No. 811.

(Results are parts in 100,000.)

Received from Dr. D. C. Lowenstine, health officer, Rye; date received, August 19, 1904; source, "Werner's private residence," Rye village; how labeled, "2." Appearance: Color, light greenish tint; turbidity, none; sediment, very slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.40; free ammonia, 0.0045; albuminoid ammonia, 0.0115; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 7.20; loss on ignition, 2.80; behavior during ignition, blackened; mineral matter, 4.40; remarks, satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

No. 812.

(Results are parts in 100,000.)

Received from Dr. D. C. Lowenstine, health officer, Rye; date received, August 19, 1904; source, "filter house," Rye; how labeled, "3." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., slight; chlorine in chlorides, 0.30; free ammonia, 0.0065; albuminoid ammonia, 0.0150; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 4.40; loss on ignition, 2.20; behavior during ignition, blackened; mineral matter, 2.20; remarks, satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

No. 813.

(Results are parts in 100,000.)

Received from Dr. D. C. Lowenstine, health officer, Rye; date received, August 19, 1904; source, "Putnam lake;" how labeled, "4." Appearance: Color, greenish-yellow tint; turbidity, very slight; sediment, slight. Odor at 100 degrees F., none; chlorine in chlorides, 0.30; free ammonia, 0.0060; albuminoid ammonia, 0.0105; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 4.80; loss on ignition, 2.20; behavior during ignition, blackened; mineral matter, 2.60; remarks, satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

No. 814.

(Results are parts in 100,000.)

Received from Dr. D. C. Lowenstine, health officer, Rye; date received, August 19, 1904; source, Richard lake; how labeled, "5." Appearance: Color, light greenish tint; turbidity, none; sediment, slight. Odor at 100 degrees F., slight; chlorine in chlorides, 0.30; free ammonia, 0.0035; albuminoid ammonia, 0.0140; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 4.80; loss on ignition, 2.40; behavior during ignition, blackened; mineral matter, 2.40; remarks, satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

ALBANY, *August* 31, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analyses of four samples of water received by your order on the 23d inst. from Dr. L. B. Rulison, health officer, Watervliet, N. Y. No description of the samples accompanied them, but in a letter dated August 22, 1904, Dr. Rulison stated that they were "taken at the request of Professor Landreth."

Aside from the presence of nitrites, which are suspiciously high, No. 815 is of fairly satisfactory quality. Free ammonia and nitrites are high in No. 816, and they are still higher in No. 817,

and neither of these samples can be considered as of satisfactory quality. The appearance of No. 817 is also bad and it is in most respects distinctly the poorest of the samples. Ammonias are comparatively low in No. 818 and nitrites absent, and this water is of satisfactory quality, as judged by our ordinary standards for surface waters, and it is decidedly the best of the samples submitted.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

No. 815.

(Results are parts in 100,000.)

Received from Dr. L. B. Rulison, health officer, Watervliet; date received, August 23, 1904; source, not stated; how labeled, "Sample No. 1." Appearance: Color, greenish-yellow tint; turbidity, slight; sediment, slight. Odor at 100 degrees F., none; chlorine in chlorides, 0.50; free ammonia, 0.0013; albuminoid ammonia, 0.0090; nitrogen as nitrites, 0.0038; nitrogen as nitrates, 0.0200; total solids, 14.40; loss on ignition, 5.20; behavior during ignition, blackened; mineral matter, 9.20; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

No. 816.

(Results are parts in 100,000.)

Received from Dr. L. B. Rulison, health officer, Watervliet; date received, August 23, 1904; source, not stated; how labeled, "Sample No. 2." Appearance: Color, greenish-yellow tint; turbidity, very slight; sediment, slight. Odor at 100 degrees F., none; chlorine in chlorides, 0.60; free ammonia, 0.0115; albuminoid ammonia, 0.0095; nitrogen as nitrites, 0.0034; nitrogen as nitrates, 0.0200; total solids, 14.80; loss on ignition, 4.60; behavior during ignition, blackened; mineral matter, 10.20; remarks, not satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

No. 817.

(Results are parts in 100,000.)

Received from Dr. L. B. Rulison, health officer, Watervliet; date received, August 23, 1904; source, not stated; how labeled, "Sample No. 3." Appearance: Color, light smoky tint; turbidity, permanently opaque; sediment, considerable. Odor at 100 degrees F., none; chlorine in chlorides, 0.40; free ammonia, 0.0265; albuminoid ammonia, 0.0145; nitrogen as nitrites, 0.0041; nitrogen as nitrates, 0.0344; total solids, 18.60; loss on ignition, 6.40; behavior during ignition, blackened; mineral matter, 12.20; remarks, not satisfactory.

Dated at Bureau of Chemistry, August 31, 1904.

No. 818.

(Results are parts in 100,000.)

Received from Dr. L. B. Rulison, health officer, Watervliet; date received, August 23, 1904; source, not stated; how labeled, "Sample No. 4." Appearance: Color, greenish-yellow tint; turbidity, very slight; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 0.50; free ammonia, 0.0035; albuminoid ammonia, 0.0085; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0256; total solids, 16.20; loss on ignition, 6.40; behavior during ignition, blackened; mineral matter, 9.80; remarks, satisfactory quality.

Dated at Bureau of Chemistry, August 31, 1904.

No. 819.

(Results are parts in 100,000.)

Received from Dr. Lucius H. Smith, health officer, Palmyra; date received, August 31, 1904; source, well; how labeled, "From Dr. Lucius H. Smith, Palmyra, N. Y." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., very slight; chlorine in chlorides, 4.60; free ammonia, 0.0020; albuminoid ammonia, 0.0060; nitrogen as nitrites, 0.0000;

nitrogen as nitrates, 0.7400; total solids, 76.60; loss on ignition, 21.80; behavior during ignition, no change; mineral matter, 54.80; remarks, not satisfactory.

Dated at Bureau of Chemistry, September 7, 1904.

ALBANY, *September* 19, 1904.

Dr. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analyses of three samples of well waters received on the 13th inst. by your order from Dr. F. L. Smith, health officer, Barryville, N. Y. These waters, and more particularly Nos. 820 and 821, belong to the doubtful class. They cannot be condemned as largely polluted and yet they show certain evidences of contamination. No. 822 is decidedly the best, and, aside from its appearance, which is not good, may be ranked as of satisfactory quality. From the descriptions furnished of the location of these wells, it would appear that they are not well located; and while such waters may often be used without apparent ill effects, wells so located are liable at any time to become specifically polluted and capable of conveying disease. Under all the circumstances I should advise that, if other and better sources of supply are obtainable, the use of the water from the Wilson and Maier wells be discontinued, or that the health officer be advised to use his discretion in the matter, since the waters cannot be unqualifiedly condemned on the results of the chemical analysis alone.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

No. 820.

(Results are parts in 100,000.)

Received from Dr. F. L. Smith, health officer, Barryville; date received, September 13, 1904; source, well; how labeled, "From Charles W. Wilson, Eldred, N. Y." Appearance: Color, none; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 0.40; free ammonia, 0.0013; albuminoid ammonia, 0.0030; nitrogen as nitrites, 0.0002; nitrogen as nitrates, 0.3332; total solids, 6.40; loss on ignition, 2.60; behavior during ignition, darkened very slightly; mineral matter, 3.80; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, September 19, 1904.

No. 821.

(Results are parts in 100,000.)

Received from Dr. F. L. Smith, health officer, Barryville; date received, September 13, 1904; source, well; how labeled, "Joseph Maier, Eldred, well is in a swamp, drawn by a pump." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., slight; chlorine in chlorides, 0.60; free ammonia, 0.0300; albuminoid ammonia, 0.0050; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0384; total solids, 8.80; loss on ignition, 1.60; behavior during ignition, darkened slightly; mineral matter, 7.20; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, September 19, 1904.

No. 822.

(Results are parts in 100,000.)

Received from Dr. F. L. Smith, health officer, Barryville; date received, September 13, 1904; source, well; how labeled, "F. R. Sergeant, Eldred, N. Y., cesspool 75 feet from well; soil, clay and hardpan." Appearance: Color, light greenish tint; turbidity, decided; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 0.30; free ammonia, 0.0005; albuminoid ammonia, 0.0020; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0832; total solids, 3.80; loss on ignition, 1.20; behavior during ignition, darkened very slightly; mineral matter, 2.60; remarks, satisfactory.

Dated at Bureau of Chemistry, September 19, 1904.

No. 823.

(Results are parts in 100,000.)

Received from Dr. A. O. Bogert, health officer, Nanuet; date received, September 17, 1904; source, well; how labeled, "From Dr. A. O. Bogert, health officer, well water." Appearance: Color, yellowish-green tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 1.90; free ammonia,

0.0040; albuminoid ammonia, 0.0090; nitrogen as nitrites, 0.0045; nitrogen as nitrates, 0.8320; total solids, 18.40; loss on ignition, 7.20; behavior during ignition, darkened; mineral matter, 11.20; remarks, not recommended for domestic use.

Dated at Bureau of Chemistry, September 26, 1904.

No. 824.

(Results are parts in 100,000.)

Received from Dr. J. R. Selover, Trumansburg; date received, September 23, 1904; source, well of Clinton Page, Trumansburg; how labeled, "From J. R. Selover, M. D." Appearance: Color, greenish-yellow tint; turbidity, very slight; sediment, very slight. Odor at 100 degrees F., none; chlorine in chlorides, 2.60; free ammonia, 0.0015; albuminoid ammonia, 0.0075; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids, 38.60; loss on ignition, 10.80; behavior during ignition, darkened slightly; mineral matter, 27.80; remarks, fairly satisfactory.

Dated at Bureau of Chemistry, September 28, 1904.

ALBANY, *October* 12, 1904.

DR. DANIEL LEWIS, *Commissioner New York State Department of Health, Albany, N. Y.:*

Dear Sir—I respectfully enclose herewith reports in duplicate on the analyses of four samples of water received by your order on the 5th instant from Dr. R. A. Whitney, health officer, Liverpool, N. Y. These waters are from shallow wells in gravelly soil, and all show more or less evidence of pollution. In the case of Nos. 825 and 826 the pollution from the soil however is neither considerable nor recent. No. 827 is largely polluted and quite unfit for use, while No. 828, although of very much better quality, is not entirely satisfactory. Such waters as these are often used for long periods of time with impunity, but they may at any time become specifically polluted, although their chemical characteristics may show no change. Under the circumstances stated by the health officer, I think it would be safer to discontinue the use of No. 825 for the present, and perhaps No. 828 also. In the case of No. 827 the well should be closed. No. 826 cannot be con-

demned, and, indeed, the only one of the four samples which can be absolutely condemned as unfit for use on the analytical results alone is No. 827.

Very respectfully yours,
WILLIS G. TUCKER,
Director.

No. 825.

(Results are parts in 100,000.)

Received from Dr. R. A. Whitney, health officer, Liverpool; date received, October 5, 1904; source, well used for washing cans and watering cows of milkman; gravel soil; typhoid fever in family; how labeled, "Number 0." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine of chlorides, 1.10; free ammonia, 0.0015; albuminoid ammonia, 0.0075; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0712; total solids, 89.40; loss on ignition, 15.60; behavior during ignition, no change; mineral matter, 73.80; remarks, satisfactory quality.

Dated at Bureau of Chemistry, October 12, 1904.

No. 826.

(Results are parts in 100,000.)

Received from Dr. R. A. Whitney, health officer, Liverpool; date received, October 5, 1904; source, school building well, 16 feet deep, soil gravel, clay; how labeled, "Number 1." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 4.30; free ammonia, 0.0005; albuminoid ammonia, 0.0030; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3040; total solids, 77.60; loss on ignition, 14.80; behavior during ignition, no change; mineral matter, 62.80; remarks, fairly satisfactory quality.

Dated at Bureau of Chemistry, October 12, 1904.

No. 827.

(Results are parts in 100,000.)

Received from Dr. R. A. Whitney, health officer, Liverpool; date received, October 5, 1904; source, well 15 feet deep, soil

gravel and clay, school no. 2; how labeled, "Number 2." Appearance: Color, light yellowish-green tint; turbidity, none; sediment, none. Odor at 100 degrees F., very slight; chlorine in chlorides, 2.50; free ammonia, 0.0890; albuminoid ammonia, 0.0080; nitrogen as nitrites, 0.0910; nitrogen as nitrates, 0.9520; total solids, 73.80; loss on ignition, 14.40; behavior during ignition, darkened; mineral matter, 59.40; remarks, polluted and unfit for use.

Dated at Bureau of Chemistry, October 12, 1904.

No. 828.

(Results are parts in 100,000.)

Received from Dr. R. A. Whitney, health officer, Liverpool; date received, October 5, 1904; source, well 14 feet deep, soil clay, Milkman H; how labeled, "Number 3." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in chlorides, 6.40; free ammonia, 0.0075; albuminoid ammonia, 0.0060; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.2960; total solids, 82.60; loss on ignition, 9.00; behavior during ignition, darkened slightly; mineral matter, 73.60; remarks, not entirely satisfactory.

Dated at Bureau of Chemistry, October 12, 1904.

No. 829.

(Results are parts in 100,000.)

Received from Peter Deyo, State Board Tax Commissioners, Capitol, Albany; date received, November 30, 1904; source, well, New Paltz; how labeled, "I. Well by house." Appearance: Color, light greenish tint; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 2.40; free ammonia, 0.0015; albuminoid ammonia, 0.0050; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3760; total solids, 36.80; loss on ignition, 17.20; behavior during ignition, darkened slightly; mineral matter, 19.60; remarks, satisfactory quality.

Dated at Bureau of Chemistry, December 7, 1904.

No. 830.

(Results are parts in 100,000.)

Received from Peter Deyo, State Board Tax Commissioners, Capitol, Albany; date received, November 30, 1904; source, spring, New Paltz; how labeled, "II. Windmill spring." Appearance: Color, light greenish tint; turbidity, very slight; sediment, very slight. Odor at 100 degrees F., none; chlorine of chlorides, 2.30; free ammonia, 0.0005; albuminoid ammonia, 0.0050; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.4880; total solids, 38.40; loss on ignition, 16.00; behavior during ignition, darkened slightly; mineral matter, 22.40; remarks, satisfactory quality.

Dated at Bureau of Chemistry, December 7, 1904.

No. 831.

(Results are parts in 100,000.)

Received from Peter Deyo, State Board Tax Commissioners, Capitol, Albany; date received, November 30, 1904; source, spring, New Paltz; how labeled, "III. Spring across road from tenement house." Appearance: Color, nearly colorless; turbidity, none; sediment, trifling. Odor at 100 degrees F., none; chlorine in chlorides, 0.90; free ammonia, 0.0000; albuminoid ammonia, 0.0020; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.2920; total solids, 17.80; loss on ignition, 6.20; behavior during ignition, no change; mineral matter, 11.60; remarks, excellent quality; superior to No. 829 and No. 830.

Dated at Bureau of Chemistry, December 7, 1904.

No. 832.

(Results are parts in 100,000.)

Received from Prof. Olin H. Landreth; date received, December 17, 1904; source, not stated; how labeled, "From Olin H. Landreth." Appearance: Color, light greenish tint; turbidity, none; sediment, none. Odor at 100 degrees F., none; chlorine in

chlorides, 0.30; total solids, 18.80; loss on ignition, 4.60; behavior during ignition, no change; mineral matter, 14.20; total hardness, 9.36; ditto, equivalent to grains carbonate lime per U. S. gallon, 5.75; permanent hardness, 5.71; ditto, equivalent to grains carbonate lime per U. S. gallon, 3.33; temporary hardness, 4.15; ditto, equivalent to grains carbonate lime per U. S. gallon, 2.42.

Dated at Bureau of Chemistry, December 22, 1904.

CONCLUSION.

As appears from the preceding no systematic examination of foods, drugs or illuminating oils has been carried on during the past year, nor for several years. This is due to the fact that the Legislature has made no provision, by adequate appropriation, for prosecuting such work. The need for it has been plainly stated from year to year in past reports and hardly needs to be restated now. In the matter of foods and drugs responsibility for enforcing the laws governing their sale is now shared by other departments, but the responsibility in the matter of illuminating oils is vested with this Department alone, and since the need is imperative, it is again urged that adequate and special provision be made for carrying on this important work so essential to the preservation of life and property in the State.

Respectfully submitted,

WILLIS G. TUCKER,

Director Bureau of Chemistry.

Albany, N. Y., January 1, 1905.

REPORT

OF

RENDERING AND GARBAGE WORKS

YEARLY REPORT OF THE RENDERING AND GARBAGE WORKS AT CHEEKTOWAGA.

January 1, 1905.

To Dr. Daniel Lewis, *Commissioner of Health:*

The Buffalo Fertilizer Co. have expended in the past year upon improvements on their new plant $10,000; they have put in five rendering tanks, four grease coolers and a new drier, all of which are now in operation. They have increased their business considerably in the past year and have disposed of 7,841 hogs, 486 horses, 246 cattle, 830 calves and 11,081 sheep, making a total of 20,484 dead animals and in addition to this 1,183,740 pounds of fat and 1,291,154 pounds of bones which were collected by their wagons from the different meat shops in the city.

They are now in good running order and can dispose of all stuff in a satisfactory and sanitary manner.

The Baynes Garbage Reduction Works have received and disposed of 22,331 tons of garbage in the past year. The maximum quantity received during any one month of the year was in September which amounted to 2,909 tons, and the minimum quantity received was in the month of February which amounted to 762 tons. They have increased the capacity of their works by the introduction of three new driers making 21 in all and these prove amply sufficient to promptly dispose (as rapidly as delivered) of the largest tonnage received during any month in the year in an efficient and sanitary manner. The motive power used in their plant consists of four steam boilers of 125 horse power each, five steam engines ranging from twelve to seventy-five horse power each, together with the requisite pumps for boiler feed and condensing purposes.

They have expended in the past year, for additions and improvements in their appliances in addition to the cost of repairs, about $4,000, and their entire plant is run in a sanitary and satisfactory manner.

The American Agricultural Chemical Company plant is in about the same condition as heretofore; they are still operating twelve rendering tanks, the capacity of which vary from five to eight tons each according to the material handled. These tanks are operated

more or less steadily the year round, and the volume of their business in the rendering line for the past year has been a little less in quantity than a year ago. With my periodical inspections, I am familiar with the manner in which they conduct their plant and their machinery and equipment are installed according to the requirements of the State Board of Health thus conducting their business in as satisfactory and sanitary manner as possible, in view of the class of materials they have to destroy or manipulate. All stuff that is at all objectionable is given their prompt and thorough attention.

In the past year they have disposed of about 5,000 hogs, 4,000 sheep and 1,500 cattle and horses making a total of 10,500 dead animals, besides a little over 2,000 tons of tallow and bones which was collected by their wagons from the different meat shops in the city.

The wagons that deliver the material to all the different works are thoroughly cleaned and disinfected after each load during the summer months, but at this season of the year they are not.

I have not received any complaints regarding any of the works and in my estimation they are all run in a satisfactory and sanitary manner.

Yours obediently,
JOHN T. CLARIS,
Inspector.

YEARLY REPORT OF THE RENDERING AND GARBAGE WORKS AT BARREN ISLAND.

NEW YORK, *January* 1, 1905.

DR. DANIEL LEWIS, *Commissioner of Health, Albany, N. Y.:*

SIR:—I have the honor to hereby submit a report of present condition at Barren Island, and a brief review of my work as inspector for the year 1904.

The establishments in my charge during the year were the same as in previous years.

First—"The Sanitary Utilization Company," which disposes of the garbage of the entire city.

Second—"Whites'," which disposes of the dead animals and offal of Manhattan, the Bronx and Richmond.

Third—"McKeevers'," which disposes of the dead animals and offal of Brooklyn and part of Queens.

Fourth—"The E. Frank Coe Company," manufacturers of fertilizers.

The season of greatest activity in the disposal plants is from early in June until the middle of September; during this period I was on duty every other day alternately with Mr. Phillips, the inspector for the City Department; at other seasons weekly trips were made except in midwinter, when travel to the island is more or less uncertain.

The Sanitary Utilization Company required the greater amount of attention. The corrosive effect of the vapors produced in the the process on metals making constant watchfulness imperative. This is an immense drawback to the company as many duplicates of the multitude of lines and valves must be kept on hand, and a constant succession of costly repairs maintained as soon as the stress of the summer season is over. Formerly the life of a digester was only two years or less, but by means of lining them with hard wood timber at the sides, brick at the bottom, and cement at the top, the period of their usefulness is much lengthened; even the iron work in the great fans becomes honey-combed in two years to such an extent that new construction is necessary. During the year a storehouse for fertilizers was completed, and the one for oil much enlarged.

A compressed air plant of large capacity was also constructed and the power is now used mainly in operating the presses. A new tower with sprays and fans for the control of the steam and gases from the dryers was another important improvement completed during the year. The amount of material disposed of was greater than in any previous year, some days amounting to nearly two thousand tons.

The only improvements of importance at White's during the year, were the placing of a new pipe line running below the digesters and connected with a condenser making the "blowing out" process unnecessary, and an entirely new set of condensers of the newest type. The work was conducted with the same regard to order and cleanliness so remarkable in other years. The amount of material disposed of at this factory was also larger than in any previous year.

At McKeevers', no improvements or changes of any kind were made during the year, and in fact I can not say that any were needed, the plant being practically new throughout. The work was well and carefully done, leaving no cause for criticism or complaint.

The E. Frank Coe Company suspended mixing as usual during the summer season. The only improvement having any bearing on sanitary conditions was the driving of an artesian well. An enormous business was done in both the fertilizers and the acid plants.

The conditions at this Island at this time are satisfactory; the Sanitary Company, as always at this season, is working energetically to get in shape for the season; whatever is necessary in this line is also being done in the other reduction plants.

The work being done at the factories on Barren Island is of great importance to the community, and with the present facilities can be done without offense to people living at any considerable distance, provided the same careful supervision on the part of the Health authorities is maintained; for in the hurry and stress of the "season" the employees can not be depended on—a big leak they would probably discover, while a myriad of small ones would escape their notice. I have been pleased to note a growing regard for neatness and cleanliness on the Island. This applies not only to the factories but to the homes of the people as well.

Respectfully submitted.

ORVILLE LEWIS,
Inspector.

PLANS

FOR

SYSTEMS OF SEWERAGE AND SEWAGE DISPOSAL.

APPROVED DURING 1904.

BALDWINSVILLE.

ORIGINAL SEWER PLANS.

Original plans for a separate system of sewers and sewage disposal for the village of Baldwinsville, Onondaga county, were approved by the State Commissioner of Health on March 9, 1904, in accordance with the provisions of chapter 414 of the laws of 1897. The plans submitted comprise:

A general sewer map, printed as Plate I of this report.

Three sheets of sewer profiles, printed as Plates II, III and IV of this report.

Plans for sewage-disposal works and pumping station, printed as Plate V of this report.

A sheet of sewer details, including details of manholes, flush tank and lampholes; on file, but not printed in this report.

A report of the designing engineers, Messrs. Farrington & Duffies, dated December 5, 1903, with a schedule of the amounts of sewage contributed by the different streets, hereto appended.

Contract, specifications and contractor's bond; on file, but not printed in this report.

SYRACUSE, N. Y., *December* 5, 1903.

To the Board of Trustees, Baldwinsville, N. Y.:

GENTLEMEN:—In accordance with your instructions we have made the necessary surveys and have prepared plans and specifications for a complete and permanent system of sewerage for the village of Baldwinsville and such plans are presented herewith. The plans consist of a general map of the village, on a scale of 200 feet to the inch; profiles of all the streets; a sheet of details, showing manholes, flush tanks and lampholes, together with a plan of disposal showing details of septic tank and its appurtenances. The general map shows all the streets of the village with five-foot contour lines, all sewers with their size, direction of flow, rate of grade and the location of manholes, lampholes and flush tanks. The elevation of the sewer invert is shown at intersections and at other important points.

The profiles show all the streets in the village, with the ground line and depth and size of the sewer, the direction of flow, rate

of grade and the position of manholes, lampholes and flush tanks. The elevations of particularly low cellars are also indicated.

The specifications, together with the form of notice to contractors, proposal and contract, give the requirements and method of construction of the entire system. The accompanying quantity sheet and estimate gives the estimated quantities and cost of work and material required for the construction in accordance with the specifications. The elevations are referred to the U. S. Geological Survey as given by the bench mark (elv. 424) established on the wall of the Baldwinsville Academy.

The accompanying report gives the description of the system and the reasons for the design.

Respectfully submitted,

FARRINGTON & DUFFIES.

REPORT.

The village of Baldwinsville, N. Y., is an incorporated village, having an area of about 1½ square miles, with a population of about 3,000 people. There has been no material change in the population during the last ten years. In 1890 it was given as 3,040 and in 1900 as 2,992.

The Seneca river divides the village into two sections of about equal area. The Baldwinsville dam affords water power to several flour mills and other manufacturing establishments located on the banks of the river and on the Baldwinsville hydraulic canal, which leads around the dam.

Seneca river at Baldwinsville has a watershed of about 3,000 square miles. The minimum flow in 1899 was 177 cubic feet per second. In September, 1900, the flow was 919 cubic feet per second.

The village owns and operates its own system of waterworks. An adequate supply is secured from springs located in the southwesterly part of the town and from which water is pumped into a standpipe, located on the high ground to the east of the village. The water is of good quality and is in general use. The quantity being pumped for all purposes at the present time ranges from 175,000 to 250,000 gallons per day. There are no pavements. Syracuse street, from the south village line to Canal street, is the only street in which there is located a street railway. This railway is located in the center of the street and it is proposed in this case to construct the sewer to one

side of the railroad track and to extend the services for the opposite side of the street across under the track, providing that the railroad company will consent to pay the expenses of such service extensions.

The business portion of the village is located on:

Syracuse street, from Tappan street to Bridge street; Bridge street, from Syracuse street to Canal street; Oswego street, from Canal street to Elizabeth street; Genesee street, from Charlotte street to Bridge street; Canal street, from Bridge street to Salina street.

The existing sewers, with some adjustments in grades at the intersections and by adding manholes, lampholes and flush tanks, may be utilized; but only those existing sewers that are found in good condition and to conform to grades given on profiles will be used. These sewers are shown by broken lines on the profiles. New sewers will be built in Genesee street, from Walnut street to Bridge street, and in North street, from Genesee street to Seneca river. The old sewers in these streets will not be used.

These existing sewers are as follows:

In Oswego street, from Canal street to Elizabeth street, 12-inch; in Oswego street, from Elizabeth street to Oneida street, 10-inch; in Oswego street, from Oneida street for 500 feet north, 6-inch; in North street, from Oneida street to Genesee street, 10-inch; in North street, from Genesee street to Seneca river, 10-inch; in Walnut street, from Oneida street to Genesee street, 8-inch; in Genesee street, from Walnut street to Bridge street, probably 10-inch.

The system is designed to care for the house sewage only. The surface water can be more directly and economically removed through the natural watercourses.

In designing the sizes of the sewers, it has been assumed that the sewage would be discharged at the rate of 100 gallons per day per capita. Allowing five persons for each 50-foot lot, or 10 persons for each 50 feet of sewer, results in 20 gallons per day per lineal foot of sewer. The sewers are designed to carry, when running half full, the entire flow of twenty-four hours in sixteen hours.

In laying out the sewer system for this village, sewers have been placed in all streets, whether they were built upon or not.

The streets are thus all provided for and the system will take care of a population of over 10,000 people. The population of the village was 2,992 in 1900 and 3,040 in 1890. From these figures it will be seen that the village is not growing and the system as designed is more than ample to take care of the sewage of the village for years to come.

It is likely that for the first few years not more than 25 per cent. of the people will connect with the sewers. At the present time if all the houses were connected with the sewers the volume of flow could not reach 300,000 gallons per day. But as not more than 25 per cent. of the population will connect at present, the disposal plant is designed to take care of 75,000 gallons per day, with a maximum limit of 100,000 gallons per day. The maximum limit is estimated to take care of ground water that may reach the septic tanks through leakage into the sewers. It seems a hardship to compel a village to build a sewer system three times larger than it will ever need, but, on the other hand, if the village should grow, it would be economy to have built the system large enough at the beginning. However, the disposal plant need not be built larger than will take care of the sewage for the first few years. Additions can be made to the disposal plant as may be needed, and in this manner the first cost of the plant will not be so burdensome to the village. The disposal lands marked on the map are ample to provide for additional septic tanks and filter beds.

In designing the system the velocity of the flow in any pipe is not allowed to fall below two feet per second when the pipe is running half full. This velocity is computed by Kutter's formula, using the coefficient of roughness equal to .013.

The disposal plant is located on the south side near Crooked brook, and all sewers are drained toward this point. The sewage from the territory north of the river is brought to the corner of Canal and Bridge streets. From that point the sewage is carried by an inverted siphon under the Baldwinsville canal and under the bridge across Seneca river to the Syracuse street sewer.

In order that all sewers shall be of sufficient depth to drain all streets, it was found necessary to drain Genesee street and branches, Tannery creek outlet and branches, and Lock street and branches into a receiving well at the intersection of Canal

and Lock streets. The remainder of the district north of the river is drained directly to the corner of Canal and Bridge streets. The sewage in the receiving well is pumped into the Canal street sewer opposite Lock street. It then flows by gravity to the disposal plant.

Considerable six-inch sewer pipe is used in designing the system, but the pipe of this diameter is used for more than one successive block only where the velocity is ample to take care of the sewage.

Special provision is made for flushing. Automatic flush tanks having a capacity of 400 gallons each are provided at the beginning of each sewer. Manholes are placed at each intersection, at each angle and at each change of grade. Lampholes are provided between manholes as indicated.

Roof water may be admitted under control of the board, while the system is new, but the amount of this water admitted is not to increase the quantity passing through the disposal plant very materially.

The elevation of the invert of the sewer is given for each sewer, both at entering and leaving the manholes. Owing to the limited amount of grade available it was deemed advisable not to allow to exceed .05 feet drop through a manhole except at such places where a change in the size of the sewer occurred.

In Bridge street, where the sewer crosses underneath the Baldwinsville canal by an inverted siphon, eight-inch cast-iron pipe is used. The drop is made through chambers located at each end and the sewer constructed in duplicate, each provided with valves so that they can be used alternately when necessary for cleaning or repairs.

Where the Bridge street sewer crosses the river it is proposed to reduce from 15-inch tile to 12-inch cast-iron and to support this 12-inch cast-iron pipe from the underside of the girders of the steel girder bridge. This bridge is comparatively new and of modern construction. The iron pipe is designed to run nearly full. This will be inclosed by a frost box.

In order to sewer those parts of Seneca and Canton streets south of Downer street it has been necessary to plan a sewer leading from the southerly end of these streets across private right of way to Syracuse street. This sewer as planned will not

only afford drainage for those parts of Seneca and Canton streets, but will also make it possible to take care of any new streets that may be opened in the territory south of Downer street and included between Canton and Syracuse streets.

Crooked brook flows into Seneca river just south of the south village line. At the point where it passes through the culvert under the Delaware, Lackawanna and Western railroad the bottom of the stream has an elevation of 360.5. At this culvert the stream is nine feet wide and at ordinary water has a depth of about three feet. The elevation of the ordinary water level of the river here is 363. Extreme high-water elevation is 368 and the elevation of extreme low water is about 361.

The receiving well on the north side is 16 feet in diameter and 7 feet deep. It is divided into two chambers for facility in cleaning. Each chamber will hold approximately 4,650 gallons. Estimating that 1,000 people are tributary to the sewers which drain into this well, it will be necessary to take care of 100,000 gallons in 24 hours, or 70 gallons per minute; but, for reasons given above, probably not more than 25 per cent. of this amount of sewage will reach the receiving well for the first few years.

Two 500-gallon pumps will be provided and placed in the pump well adjacent to the receiving well. These pumps will be operated by electric motors, which will be operated automatically to begin pumping when the well is full and so regulated that the amount of sewage pumped into the high-level sewer will not be suddenly increased in volume, the idea being to keep the flow in the sewers as nearly uniform as possible. The force main leads to a specially constructed manhole on the Canal street sewer opposite Lock street, where the sewage is delivered, and then flows by gravity through Canal street.

The disposal plant consists of a receiving well, pump chamber, septic tank, filter beds and sludge bed. The receiving well is 30 feet in diameter, 7 feet deep and is divided into two chambers, each chamber holding approximately 17,000 gallons. The well is made of this capacity so as to take care of the total sewage of the village and is divided into two chambers to facilitate cleaning. At present two 500-gallon centrifugal pumps operated by electric motors will be placed in the pump well. These motors will be operated automatically. When the sewage is of such

volume that it can not be pumped by the 500-gallon pumps, larger pumps will have to be furnished. The rate of running these pumps will be so regulated as to produce a nearly continuous flow from the receiving well into the grit chamber of the septic tank. The sewage will be pumped through a 10-inch cast-iron force main to the septic tank, where it will be delivered at an elevation of 381.42. A check valve will be placed in the force main to prevent any back flow from the septic tank through the pumps. The sewage will first be received in a grit well, where the mineral matter will have a chance to settle. The sewage then passes into the septic tank proper through the 12-inch cast-iron pipe or over the weir. Slots are provided so that flash boards may be placed over this weir. In this manner the raw sewage may be forced into the septic tank through the 12-inch pipe openings. If organic matter collects in the grit chamber the flash boards may be removed and the matter allowed to pass on into the tank. This septic tank will hold about 75,000 gallons, which is considered ample to take care of the sewage from the village for several years. When necessary, additional septic tanks can be built alongside of the present one. The organic matter passes on into the tank, where it is subjected to bacterial change and becomes liquefied. Baffle boards are placed at intervals to prevent any undue movement of the surface "scum," and the baffle board near the farther end of the tank is slightly tilted, so as to keep the "scum" to the surface. The effluent passes under this baffle board and over an aerating weir into the effluent chamber. The effluent chamber is provided with a siphon of special construction so as to deliver very rapidly. The effluent flows through a 12-inch pipe to the filter beds. The filter beds will consist of six beds. The upper beds will be filled with sand. The next two beds will be filled with crushed rock, and the last two beds will contain coarse crushed rock or broken stone. It is proposed to operate one row of beds at a time, the other beds being allowed to rest. Each bed contains approximately 3,200 square feet or three beds contain 9,600 square feet. This is about .22 of an acre and will take care of nearly 100,000 gallons per day, or at the rate of 500,000 gallons per acre per day. Ample room is provided at the disposal site for more beds.

A sludge bed of about 3,000 square feet and provided with suitable filtering material is prepared near the bank of Crooked brook. Whenever it is necessary to clean out the septic tank, the sludge will be washed on to this sludge bed and allowed to filter through it.

The pump chambers will be covered with substantial brick buildings, as shown on the plans.

Respectfully submitted,

FARRINGTON & DUFFIES,

Civil Engineers.

SYRACUSE, N. Y., *March* 3, 1904.

BALDWINSVILLE SEWER SYSTEM.

NORTH SIDE.

		Gallons.	
Gaston Street and Branches:			
Phillips st.	—N. S. village to E. Oneida st.	19,280	
E. Oneida st.	—E. S. village to Phillips st.	8,560	
Phillips st.	—E. Oneida st. to Gaston st.	9,600	—37,440
Gaston st.	—E. S. village to Phillips st.	12,740	
Gaston st.	—Phillips st. to Pine st.	11,280	—61,460
Pine st.	—Gaston st. to E. Oneida st.	12,560	
E. Oneida st.	—Pine st. to Phillips st.	11,540	
Gaston st.	—Spruce st. to Pine st.	9,820	—95,380
Gaston st.	—Salina st. to Spruce st.	19,840	—115,220
Salina Street and Branches:			
Salina st.	—E. S. village to Wood st.	27,200	
Salina st.	—Wood st. to Tabor st.	1,800	—29,000
Salina st.	—Tabor st. to Margaret st.	13,300	—42,300
Margaret st.	—Salina st. to D. L. & W.	8,120	
Salina st.	—Margaret st. to Gaston st.	12,160	—62,580
Canal Street and Branches:			
Canal st.	—Gaston st. and branches	115,220	
Canal st.	—Salina st. and branches	62,580	
Canal st.	—Salina st. to Lock st.	6,600	—184,400
Virginia st.	—		
Canal st.	—Lock st. to Virginia st.	9,660	—194,060
Virginia st.	—Canal st. to Elizabeth st.	13,900	
Canal st.	—Virginia st. to Bridge st.	14,980	—222,940
Oswego Street and Branches:			
Oswego st.	—N. S. village to Oneida st.	25,820	
Oswego st.	—Oneida st. to Elizabeth st.	20,520	—46,340
Elizabeth st.	—Virginia st. to Oswego st.	16,480	
Oswego st.	—Elizabeth st. to Bridge st.	9,760	—72,580

		Gallons.	
Genesee Street and Branches:			
W. Oneida st.	—Chestnut st. to Genesee st	17,500	
Genesee st.	—W. Oneida st. to Chestnut st	20,280	—37,780
Chestnut st.	—Genesee st. to W. Oneida st	9,860	
Oneida W. st.	—Chestnut st. to Walnut st	8,620	
Genesee st.	—Chestnut st. to Walnut st	8,940	—65,200
Walnut st.	—Genesee st. to W. Oneida st	14,380	
W. Oneida st.	—Walnut st. to North st	9,120	
Genesee st.	—Walnut st. to North st	9,760	—98,460
North st.	—Genesee st. to W. Oneida st	19,200	
W. Oneida st.	—North st. to Oswego st	7,240	
Genesee st.	—North st. to Charlotte st	15,000	—139,900
Charlotte st.	—Genesee st. to North st	15,440	
North st.	—Charlotte st. to Genesee st	11,020	
River st.	—Branch	5,000	
Genesee st.	—Charlotte st. to Bridge st	6,020	—177,380
Bridge Street and Branches:			
Canal st. and branches		222,940	
Oswego st. and branches		72,580	
Genesee st. and branches		177,380	
Bridge st.	—Canal st. to Seneca river	8,800	—481,700
Lock Street and Branches:			
E. Oneida st.	—Oswego st. to Virginia st	22,600	
Virginia st.	—Elizabeth st. to E. Oneida st	13,980	
E. Oneida st.	—Virginia st. to private right of way	34,890	—71,470
E. Oneida st.	—Spruce st. to private right of way	25,000	—96,470
Elizabeth st.	—Virginia st. to private right of way	17,640	
Elizabeth st.	—D. L. & W. to Mechanics st	10,580	
Mechanics st.	—Gaston st. to Elizabeth st	12,180	
Elizabeth st.	—Mechanics st. to private right of way	6,500	—143,370
Lock st.	—Canal st. to Margaret st	8,950	
Margaret st.	—Lock st. to Salina st	7,880	—160,200
Lock st.	—Margaret st. to outlet	3,000	—163,200
Wood st.	—Salina st. to Lock st	13,200	
Lock st.	—Wood st. to Tabor st	4,830	—18,030
Lock st.	—Tabor st. to outlet	4,010	—22,040
	Total for Lock street system		185,240
	Total for North Side		666,940

SOUTH SIDE.

Water Street and Branches:			
Water st.	—Meadow st. to Syracuse st	9,660	
Water st.	—Canton st. to Syracuse st	8,740	
Canton st.	—Tappan st. to Water st	6,360	—24,760
Tappan Street and Branches:			
Tappan st.	—W. S. village to Division st	30,040	
Division st.	—Branch	11,000	
Tappan st.	—Division st. to McHaire st	16,040	—57,080

		Gallons.	
Tappan Street and Branches—Continued			
McHaire st.	—Branch	12,000	
Tappan st.	—McHaire st. to Seneca st.	11,000	—80,080
Seneca st.	—Branch	22,160	
Tappan st.	—Seneca st. to Canton st.	10,180	—112,420
Canton st.	—Branch	9,280	
Tappan st.	—Canton st. to Syracuse st.	12,460	—134,160
Grove Street and Branches:			
Canton st.	—Downer st. to Grove st.	10,560	
Grove st.	—Canton st. to Syracuse st.	18,200	—28,760
Bisdee Street and Branches:			
Meadow st.	—Water st. to Bisdee st.	9,300	
Bisdee st.	—Meadow st. to Syracuse st.	9,880	—19,180
Downer street and Branches:			
Downer st.	—Seneca st. to Canton st.	10,300	
Downer st.	—Canton st. to Syracuse st.	23,860	—34,160
Private Right of Way:			
Downer st.	—W. S. village to Division st.	28,780	
Division st.	—Branch	15,540	
Downer st.	—Division st. to McHaire st.	10,300	—54,620
McHaire st.	—Branch	12,000	
Downer st.	—McHaire st. to Seneca st.	11,240	—77,860
In Seneca st.	—	20,000	—97,860
Private right of way	—Seneca st. to Canton st.	6,800	—98,540
In Canton st.	—	20,500	
Private right of way	—Canton st. to Syracuse st.	37,480	—156,520
Syracuse Street and Branches:			
From north side		666,940	—666,940
Syracuse st.	—Bridge st. to Marble st.	3,060	—670,000
Marble st.	—	11,420	
Syracuse st.	—Marble st. to Water st.	2,860	—684,280
Water st.	and branches	24,760	
Syracuse st.	—Water st. to Tappan st.	5,400	—714,440
Tappan st.	—Branches	134,160	
Syracuse st.	—Tappan st. to Grove st.	8,700	—857,300
Grove st.	—Branches	28,760	
Bisdee st.	—Branches	19,180	
Syracuse st.	—Bisdee st. to Greenfield st.	12,920	—918,160
Greenfield st.	—Branch	10,580	
Downer st.	—Branch	34,160	
Syracuse st.	—Greenfield st. to Hotaling st.	6,280	—967,180
Syracuse st.	—Hotaling st. to outlet	20,630	
Syracuse st.	—S. S. village to outlet	6,900	—996,710
Private right of way and branches		98,540	—1,095,250
Total for entire village			1,095,250

CANANDAIGUA.

Sewer Improvement.

On October 4, 1904, the State Commissioner of Health approved plans for an improvement in the Hubbell street sewer in the village of Canandaigua, Ontario county, under the provisions of section 21 of the Public Health Law. The plans submitted comprise:

A map of the Hubbell street sewer connections, on file, but not printed in this report.

Certificate of the board of health of the village of Canandaigua to the board of said village as to the condition of the Hubbell street sewer connections, with certificate of indorsement by the board of trustees; on file but not printed in this report.

COLD SPRING.

Original Sewer Plans.

Original plans for a separate system of sewers for the village of Cold Spring, Putnam county, were approved by the State Commissioner of Health on June 24, 1904, in accordance with the provisions of chapter 414 of the laws of 1897. These plans comprise:

A map of the village on a scale of 300 feet to the inch, showing the corporation limits, street lines and the distribution, volume and direction of flow of sewage, marked "Sheet No. 2," and printed as Plate VI of this report.

A contoured map of the village on a scale of 200 feet to the inch, showing the corporation boundaries, street lines and the general location of sewers, marked "Sheet No. 3" and printed as Plate VII of this report.

A general sewer map of the village on a scale of 100 feet to the inch, without contours, but showing full sewer data and

information, and containing a table giving schedules of the different sewer locations, sizes, lengths and depths, marked "Sheet No. 4," and printed as Plate VIII of this report.

A map and plan of the Main street dock, showing proposed arrangement of sewer outlet, printed as Plate IX of this report.

A sheet of profiles, with accompanying detailed street plans of Lock street, Kemble avenue and Furnace street, marked "Sheet No. 7," and printed as Plate X of this report.

Thirteen sheets of sewer profiles, with their accompanying detailed street plans, marked "Sheets Nos. 8, 9, 10, 11, 12, 13, 14;" on file, but not printed in this report.

A sheet of details of manholes, lampholes and method of supporting outlet sewer on timber and concrete, marked "Sheet No. 6;" on file, but not printed in this report.

A report by the designing engineer, Mr. J. Y. Wheatley, dated May 9, 1904, accompanied by a sheet of data used in the sewer conclusions, hereto appended.

Supplementary report by the designing engineer, dated June 15, 1904; on file, but not printed in this report.

Specifications for the construction of the sewer system; on file but not printed in this report.

REPORT.

(To accompany plans and specifications for transmission to the State Board of Health.)

COLD SPRING, N. Y., SEWERAGE SYSTEM.

Cold Spring, N. Y., is a village on the east bank of the Hudson river, situated in the heart of the Hudson Highlands, at a distance of about fifty miles from New York city. The area of Cold Spring within its corporate limits is 312 acres, of which, however, only about 175 acres is used for residential and business purposes and for which a sewerage system is necessary. The present population of the village is about 2,000, but is variable and increasing but slowly.

The main portion of Cold Spring is situated on land having a more or less uniform fall toward the Hudson river, which, at this point, has an average width of about 1,800 feet and a depth varying from 10 to 300 feet; the general rate of fall of the land

toward the river is about 5 feet to 100 feet, all of which, together with its other topographical features, are shown in detail on the maps accompanying this report. The soil of the locality is principally of rather fine sand, mixed with coarse gravel and many small and large detached boulders, with occasional outcropping of bed rock.

The water of the Hudson river at this point is too salty to be used for domestic purposes; the nearest point at which it is so used being at Poughkeepsie, some 20 miles to the north.

Owing to the mountainous nature of the Highlands, there are no villages or towns of any size within five miles to the north or south of Cold Spring, and owing to the extreme depth of the river there is no shallow land or land uncovered by the fall of the tide in the immediate vicinity.

In determining upon the nature of the proposed system of sewers for Cold Spring the separate system, so called, was decided upon, not only because of the useful action of storm water in cleaning the streets and gutters, which it effectually does, owing to the rapid fall of the street grades, but also because the "run-off" of the rainfall after each storm is so copious, owing to the topographical features of the village, and its velocity is so great that to provide for the disposal of such storm water by including it in the proposed sewage-disposal system would necessitate the use of such large size and costly sewers as to make their construction beyond the financial abilities of the citizens.

In determining the nature and extent of the needs of the village for sewage disposal and to meet all possible demands of future growth and increased manufacturing and domestic needs, the area of the village within its incorporated limits was divided into drainage areas as determined by its topography—that portion of the village not subject to sewering being omitted from the total area treated.

This division into drainage areas of domestic or house sewage is clearly shown on Sheet No. 2 of the sewer plans accompanying this report, and needs but little description here.

As a basis of calculation of the maximum volume of sewage to be cared for, the assumption was made that the per capita

quantity of water used per 24 hours was 100 gallons. To allow for concentrated flow an additional per capita allowance of 75 gallons per 24 hours was allowed, making the estimated per capita consumption of water per 24 hours 175 gallons, which, being reduced, becomes .1215 gallons per capita per minute, or .00027 cubic feet per capita per second.

To provide for all possible future growth of population, each acre of the 175 acres to be sewered was supposed divided into 12 city lots and the assumption made that the maximum population would be six people to each city lot. From this we have: $.1215 \times 6.0 \times 12.0 = 8.748$ gallons of sewage per minute per acre as the maximum possible volume of sewage to be cared for, or its equal, .01944 cubic feet per second per acre. Multiplying these factors by 175, the total area to be sewered, we obtain: $8.748 \times 175.17 = 1{,}532.74$ gallons per minute, or $.01944 \times 175.17 = 3.4054$ cubic feet per second as the total volume of sewage at the point of discharge of the entire system.

As the plans for the system provide for the discharge of the sewage directly into the waters of the Hudson river, when we consider that this amount of sewage—the greatest possible under any set of conditions—is to be discharged into a river 1,800 feet in width, with an average depth at this point of at least 100 feet and a comparatively high velocity of flow, the possibilities of contamination of the river water by this comparatively infinitesimal volume of sewage reduces to a practically zero quantity.

The great depth of the river water and the absence of any land uncovered by the tides at any point in the vicinity of the point of discharge either above or below, together with the fact already stated that the water is not used for domestic purposes within 20 miles of Cold Spring, reduces the danger or possibility of contamination to an even yet smaller amount.

Following the suggestion made in the manual containing the instructions as to report and sewer plans issued by your board, I have prepared Sheet No. 2 of the drawings accompanying this report so that it clearly shows the maximum volumes of sewage to be disposed of by each sewer branch and main, its direction of flow and other data, so that the entire proposed system is at once clearly shown, together with the assumptions made and the results obtained by the use of the factors as above given.

A table of minimum self-cleansing grades allowed is also shown on the sheet, together with all other assumptions and factors used in the calculations of quantities, grades, sizes and all other details of the plans and designs submitted.

The minimum size of sewer used in the proposed system has been taken as eight-inch and larger sizes used where the volume of flow and other factors make such increased size either necessary or expedient. All sewers of whatever size are of circular vitrified sewer pipe, with the exception of the last section of the main sewer at the point of discharge, which is a circular brick sewer of 24-inch internal drain. This portion of the system lies between high and low water tidal levels in the river, but entirely above low water, so that the entire sewer is above the water level twice in each 24 hours.

As the point of discharge of the main trunk sewer is at the channel line, which is almost perpendicular, no device for extending the sewer out into the river is necessary, as would be the case were the banks of the channel more sloping or if the channel were further out from the end of the sewer than is actually the case.

The maps and profiles accompanying this report are intended to be as complete as possible and to conform in every particular to the printed requirements of the State Health Department. They show the location, size, length, depth, fall per 100 feet, and all other data of each sewer and branch, together with their appurtenances, while specially prepared maps show by contours and elevations all the topographical features of the village and vicinity.

The average depth of manholes and sewers has been kept at about eight feet, as determined by the elevations of the bottoms of the cellars along the lines of the sewers, the deepest of which are shown on the profiles.

Iron pipe has been used where the sewer crosses under the tracks of the New York Central railway and timber and other foundation will be introduced where the prevention of settling of the sewers so requires, as determined during construction.

At each manhole of the entire system the plans show by figures properly placed the elevation of the street grade, or top of man-

hole cover, the elevation of the invert of the entering and exit main and the elevations of the inverts of all lateral sewers entering that manhole. The total length between each manhole, total fall and fall per 100 feet of all sewers and the average depth of each section of sewer between manholes is also clearly shown. In fact, the maps are believed and intended to give in detail complete data and information as to each sewer and its appurtenances, and all requirements, as printed in the State Health Department Manual, have, it is believed, been carefully complied with.

Copies of the construction specifications are also included, with the plans setting forth the requirements of details of the proposed construction.

Much of the data required to be given will be found in the shape of tables and of "notes" lettered on the plans and profiles, as well as all factors and assumptions made for the purposes of calculation and design of the system.

All maps, plans, profiles, etc., including the 20 sheets of drawings, are in duplicate, both sets being on tracing cloth, and the "duplicate" set intended for filing at the State Health Department at Albany, are in black ink, as required by the regulations, and are marked "Duplicate."

The only special feature of the proposed system to be noted is that a small portion of the southerly part of Market street is independent of the system and has a separate point of discharge into the Hudson river. This is due to the fact that the five or six houses shown on the plans (Sheet No. 9) between manhole No. 122 and manhole No. 119 have deep basement or cellar kitchens, which require a great depth, comparatively, of sewer for their drainage, and as the excavation for the sewer in Market street is at this point in solid rock for almost its entire depth the cost of draining these houses north into Main street, as would otherwise be done, would require under the best possible circumstances a depth of sewer of at least 20 feet for several hundred feet in length, all of which would have to be excavated in solid rock at a cost of many hundreds of dollars.

As this cost would be incurred solely in order to allow the sewage for five houses to be discharged into Main street, the

reason for making a separate point of discharge of this sewage into the river is apparent. As the total present amount of sewage which will be thus separately discharged is from *five houses* only and the greatest possible volume of sewage that would be discharged at any time in the future would be from the houses which might be constructed on both sides of a street about 300 feet long, the objections which might be raised to such an independent separate point of discharge become very insignificant, and especially when the very large cost of the alternate construction is taken into consideration.

Reference to Map No. 3, which is a topographical map of the entire village of Cold Spring, will show that a portion of the area is not included in the proposed system of sewerage. The reason for this is twofold. First, because part of the area omitted consists of large private estates, containing no present or proposed system of streets, and hence not subject to sewering, and, second, because, as the topographical map will show, the other portion of the omitted area is a deep ravine or valley, in which is situated the works of the West Point foundry, and, owing to its topographical features, this can not be included in the present system.

Every "official" street in the village is, however, included in the proposed system.

The maps, plans, specifications, report, etc., have been prepared to comply in all respects with the requirements of the State Health Department, and it is believed that they furnish all the data prescribed.

The requirement that the "duplicate" set of drawings to be retained for filing at Albany shall be in black ink only was overlooked in the preparation of the maps, but when observed was rectified by changing all colored ink drawings to a uniform black.

The drawings, being made in great detail, will not need further description here.

Respectfully submitted,

J. Y. WHEATLEY, C. E.,

Chief Engineer.

COLD SPRING, N. Y., *May* 9, 1904.

DATA FOR CALCULATIONS.

Volume of Sewage.

312 acres total area within corporation limits.

175.17 acres total area producing sewage to be cared for.

Assuming 12 city lots to one acre, 6 people to each city lot, 12×6=72=number of people per acre; 72×175.17=12,612=total number of people producing sewage to be cared for.

Assuming 100 gallons sewage per capita per 24 hours, 75 gallons sewage per capita per 24 hours allowed for concentration of flow, 175 gallons sewage per capita per 24 hours, total .1215 gallon sewage per capita per minute, .00027 cubic foot sewage per capita per second; .1215+6=.7290 gallons per minute per lot; .7290×12=8.748 gallons per minute per acre sewage to be cared for; .00027×6=.00162 cubic foot per lot per second; .00162×12 =.01944 cubic feet per acre per second.

8.748×175.17=1,532.7375 gallons=total volume sewage in gallons to be discharged per minute at outlet.

.01944×175.17=3.4054 cubic feet=total volume sewage in cubic feet to be discharged per second at outlet.

Minimum Self-cleansing Allowable Grades.

Grades in feet, fall per 100 feet and velocity (feet) per second.

For 8″ sewers—fall 0.50 per 100′=2.35′ per second, minimum velocity.

For 10″ sewers—fall 0.40 per 100′=2.45′ per second, minimum velocity.

For 12″ sewers—fall 0.32 per 100′=2.52′ per second, minimum velocity.

For 15″ sewers—fall 0.30 per 100′=2.81′ per second, minimum velocity.

For 18″ sewers—fall 0.24 per 100′=2.83′ per second, minimum velocity.

For 20″ sewers—fall 0.20 per 100′=2.84′ per second, minimum velocity.

For 24″ sewers—fall 0.16 per 100′=2.86′ per second, minimum velocity.

24x36 brick sewers fall 0.10 per 100′= —— per second, minimum velocity.

General Provisions.

Minimum flow can be taken as 1/7 of maximum.

Capacity of sewer taken as running one half full.

Average minimum depth of flow taken at .25 to .3 radius of invert.

Absolute minimum velocity of flow taken at 1.5′ per second.

CORTLAND.

CHANGE OF PLAN.

Original plans for a system of sewers and sewage disposal for the village of Cortland, Cortland county, were approved by the State Board of Health on October 27, 1892, and appear in the thirteenth annual report.

On August 9, 1904, the State Commissioner of Health approved a plan for a change of the sewer in Clinton avenue and Elm street, in accordance with the provisions of chapter 468 of the laws of 1903. These plans comprise:

A map of the portion of the sewer system in the vicinity of the sewers changed, printed as Plate XI of this report.

A profile of the sewers on Clinton avenue and Elm street as changed, printed as Plate XII of this report.

CUBA.

AMENDED SEWER PLANS

Plans for a separate system of sewers and sewage-disposal works for the village of Cuba, Allegany county, were approved by the State Commissioner of Health on February 27, 1903, and appear in the twenty-fourth annual report.

On April 26, 1904, the State Commissioner of Health approved a set of amended sewer plans, and also an original plan for the surface drainage of the village. The plans submitted comprise:

An amended sewer map, printed as Plate XIII of this report.

A revised plan for the sewage-disposal system, printed as Plate XIV of this report.

A map of a surface drainage system for the village, printed as Plate XV of this report.

A sheet of details for the surface drainage system, printed as Plate XVI of this report.

A report by the engineer who revised the system, Mr. George W. Rafter, dated August 1, 1903, hereto appended.

Specifications, contract, notice to contractors and form of proposals for the construction of the sewer system, disposal works and surface drainage system; on file but not printed in this report.

ROCHESTER, N. Y., *August* 1, 1903.

To the Board of Trustees, Cuba, N. Y.:

GENTLEMEN:—The undersigned herewith reports in reference to the revision of the sewerage plan of Cuba village, as well as a plan for the surface drainage.

Cuba village is not very satisfactorily located; it is chiefly at the south side of a valley with the flats of Oil creek in the northern part of the village and extending half to three-quarters of a mile north of the same. This creek has comparatively slight fall— at the culvert under the Pennsylvania railroad, 4,768 feet north of the junction of Tannery creek with old Genesee Valley canal, the elevation of low water surface is 1,483.4 feet above tide water, while just below the sewage-disposal works, the elevation is 1,476.1 feet. The distance, following the meanderings of the stream, is perhaps four miles and the difference in elevation, 7.3 feet, whence we have 1.8 feet fall per mile. Taking into account the meandering of the stream, this fall is too small for thorough drainage, and accordingly whenever there are flood flows, the creek sets back over a considerable area. There is absolutely no remedy for this except to straighten and deepen the creek channel, at an expense which would be entirely prohibitive for Cuba village to undertake, although drainage can never be made fully satisfactory until something of this character is done. We may, however, considerably improve the conditions, and to

this problem the writer has addressed himself in designing the surface drainage system herewith submitted, as well as in the revision of the plans for the separate system of sewerage.

On June 2, 1903, the board of trustees passed a resolution authorizing the undersigned to revise the sewer plans and specifications so as to provide for a possible population of 3,000, and also to prepare plans and surveys for street surface drainage. It is in accordance with this resolution that the revision of plans for the separate system of sewerage and plans for a surface drainage system are herewith submitted.

The original sewer plans were submitted by Prof. Olin H. Landreth of Schenectady, N. Y., under date of November 1, 1902. The plans as submitted by Professor Landreth are on the basis of an ultimate population of 7,300 and of 100 gallons of sewage per capita per day, making an ultimate sewage flow of over 700,000 gallons per day. These plans were worked out in a very able manner, but at a letting held June 1, 1903, it was found that the lowest bid considerably exceeded the estimate.

In order to determine the probable rate of increase in population at Cuba, the United States census reports have been consulted. From these reports the following record was obtained:

Year.	Population.	Increase.	Per cent.
1880	1,251	....	....
1890	1,386	135	11
1900	1,502	116	8
Increase in twenty years		251	

It appears from the foregoing that the increase in population has been 251 in 20 years, and that, therefore, providing for an ultimate population of 3,000 is ample. As to why Professor Landreth made such liberal provision, it may be remarked that during the summer of 1902 an oil well was drilling near the west end of Cuba reservoir, and Professor Landreth was considerably impressed with the probability that Cuba might become an oil town and grow rapidly. The writer is informed, however, by parties interested in oil prospecting, that there is no probability of this—that the territory about Cuba has been

worked over, only dry wells appearing. Under these circumstances a provision for more than 3,000 people appears unnecessary.

As to the further provision for a sewage flow of 100 gallons per capita per day, it may be remarked that this also seems more liberal than necessary for a village like Cuba. The flow of sewage is controlled by the water supply and there are many towns in England and on the continent of Europe generally where the use of water does not exceed from 30 to 40 imperial gallons per capita per day, although it is proper to state that in some of these towns the use appears to be slowly increasing. There are also a great many towns in the United States where the use of water does not exceed from 30 to 50 United States gallons per capita per day, and in a number of these the use of water has not increased any in a good many years, and even in a few cases has slowly decreased. The tendency, therefore, seems to be a decrease in the use of water in the United States, with probably a small increase abroad. The final result will be the use of from 50 to 60 gallons per capita per day. The revision of the plans of the separate system of sewerage for Cuba have, therefore, been made for the use of 70 to 100 gallons per capita per day—one half of this quantity to be used in eight hours.

In reference to the considerable amount of six-inch pipe which has been used in the revision, it may be stated that none of this pipe has a grade of less than 0.6 foot per 100 feet, and generally the grade considerably exceeds this. There does not seem to be any good reason, therefore, why six-inch pipe may not be used, especially since flush tanks are placed at the heads of the sewers. The grades are the same as those designed by Professor Landreth. In the revision, the pipes have been made smaller, but it is proper to note that the result of reducing the size of the pipes is to reduce the velocity of flow, and accordingly in addition to the flush tanks it is proposed to make 10 connections with the water mains, by which a strong flush can be sent through the sewers whenever necessary by merely opening a stopgate. These connections will be located at the points where most needed.

Moreover, it may be noted that computations of flow have been made with $n=0.013$, although for perfectly smooth pipe it

would be allowable to use n=0.009. But with value of n=0.009 the quantity passing through the pipe of a given size, laid on given grade, is about 80 per cent. greater than the quantity passing through the same pipe with n=0.013. This fact is merely cited to show that there is considerable uncertainty as to the flow through sewers. Probably the tendency of engineers at the present time to use comparatively large values of n is because of the tendency of pipe manufacturers not to do the best possible in the way of making the interior of pipes perfectly smooth. Professor Landreth estimates that the ground water passing into the sewers will be about 178,000 gallons per day. The writer considers that this must be a very general estimate, because no method of accurately estimating the leakage into a sewer has as yet been worked out. Undoubtedly there will be some leakage into the sewer, but how much can not be determined; it will depend entirely upon the care with which the pipe joints are made. The writer considers that there is no very serious difficulty about making the joints nearly tight, although such a result will imply some painstaking on the part of the contractor and all concerned. Nevertheless there may be expected some leakage, but it is impossible to determine just the quantity.

As the result of digging test pits, it is considered very desirable that the grade of the stream to east of Mechanic street be reduced somewhat in its upper reaches and that a drain be laid from said stream to south of Stevens avenue, extending as far west as South street. This drain will be 6 inches in diameter and laid on a grade of 0.3 foot per 100 feet.

The revised plans do not include any future low-level sewers, not only because it is extremely improbable that such will be built, but because they are fully shown on the original plan as submitted by Professor Landreth, from which they may be obtained at any time.

A revision of the septic tank, proposed for the sewage disposal, has also been made, considerably reducing the expense without affecting the efficiency of the tank, and at the same time the tank has been made materially larger. In regard to the use of the septic tank, without any filtration, the writer is constrained to say that he can not but think that it is an oversight and ought

not to be done. The reason for this is the extremely low purification effected by the tank, thereby, in effect, turning crude sewage into the stream. Probably the reason why it was proposed by Professor Landreth was because not only of the difficulties of constructing any filtration at the point proposed, but because of the considerable additional expense. The writer agrees as to the difficulty of filtration here, and in order to construct proper filtration, the sewage disposal of Cuba would cost from $6,000 to $7,000, instead of half that amount, as proposed. The writer does not desire to go into this matter extensively, but he believes that no substantial gain will be made by the septic tank, as proposed, and that it would be about as well to let raw sewage go into Oil creek as to provide a septic tank in which the sewage is not retained more than from six to eight hours. For efficient results the sewage should be retained in a septic tank from 24 to 36 hours. But were this done, the size of the tank becomes so large that the expense is prohibitive. What is proposed, therefore, is that the septic tank be omitted for a few years until, at any rate, the flow of sewage at Cuba becomes large enough to really constitute a nuisance in Oil creek.

The catchment area of Oil creek, including Tannery and Griffin creeks, is about 50 square miles, and the minimum flow may be taken at 0.1 of a cubic foot per second per square mile, or at a total flow of 5.0 cubic feet per second. Probably, owing to a leakage of the gates at Cuba reservoir it is somewhat more than this, but we will take it at 5.00 cubic feet per second.

The standard of Mr. Hering permits of a flow of three cubic feet per second for each 1,000 inhabitants contributing sewage. A stream with such a flow will take sewage without offensive conditions. We have, therefore, in this creek a minimum flow large enough to take care of the sewage of, say, 1,700 people without causing a nuisance. It is doubtful if as many people as this will be connected with the sewers for several years. For a year or two it is improbable that more than 1,000 to 1,200 people will be connected. Moreover, there is a simple remedy by which more water may be placed in the stream than this. Oil creek reservoir, which is the property of the State, with a storage of about 600,000,000 cubic feet, may be, when required, drawn upon to the extent of, say, four to six cubic feet per second.

Probably 100 days in a year would be sufficient for this, or a total amount of water of from 43,000,000 to 50,000,000 cubic feet drawn from this reservoir will keep Oil creek at a flow never less than from 8 to 10 cubic feet per second, thereby providing for the crude sewage of 3,000 people without offense. This quantity is only 8 per cent. of the entire contents of the reservoir. The reservoir was originally constructed to supply the Genesee Valley canal, but since the abandonment of that canal it is not used other than to supplement Genesee river in time of low water. There is no reason, therefore, why it may not also assist the minimum flow of Oil creek. An order from the Superintendent of Public Works to the gatekeeper is all that is necessary to insure this result. If this is done, with from 8 to 10 cubic feet per second of water flowing in Oil creek, it is probable that the crude sewage of 3,000 people will make less offense in the stream than will the sewage of 3,000 people with such purification as the septic tank as proposed can give and only five cubic feet per second of water flowing therein. In order to insure definite results, a weir should be constructed at the proper point in the channel at the expense of Cuba village.

In case this suggestion is acted upon, the estimate for the separate system of sewers will be reduced $3,400, with corresponding reduction of maximum and minimum estimates.

In regard to the surface drainage system, the first point to be considered is the main outfall for the drainage water from Cuba village. This outfall is by way of the Genesee Valley canal. Tannery creek, with a catchment area of about six square miles, enters this creek about 900 feet northeasterly from the Pennsylvania depot, and Griffin creek enters the old canal about 2,100 feet west of the Pennsylvania depot. The water from Tannery creek flows north 4,768 feet, where it passes out of the old canal through a culvert under the railway. This culvert is now 10 feet wide and about 6 feet deep. The area is insufficient to properly discharge flood flows of Tannery creek and any improvement of the surface drainage must be accompanied by a radical enlargement of this culvert. The cross-sectional area of the old canal is about 130 square feet, or when completely filled, perhaps 150 square feet, while the culvert in question is only from 60 to 70 square feet. The culvert should be made 20 feet wide, in

order to discharge the flow of this stream without backwater. The extreme flood flows of Tannery creek may be taken at about 80 to 85 cubic feet per second per square mile, or at a total of 500 cubic feet per second. It is evident that the old canal, with a sectional area of from 130 to 150 square feet, can easily discharge this amount of water with the grade and fall which it actually has, as shown on the accompanying profile. Nevertheless, the old canal should be cleaned, thereby reducing the resistance factor very materially. With this canal properly cleaned, n, the coefficient of rugosity, applying in the formula, $v = C\sqrt{rs}$ ought not to exceed a value of about 0.030; whereas, while in its present condition, n easily has a value of at least 0.050 to 0.055. The immense difference in discharging capacity of this channel which exists under these circumstances will be appreciated by hydraulic engineers if not by the laity.

Griffin creek has a catchment area of about 13 square miles and a flood discharge the same as Tannery creek, of from 80 to 85 cubic feet per second per square mile, or a total of something like 1,050 cubic feet per second. The channel of the old canal from the point where Griffin creek enters same west to the culvert under the railway is large enough to discharge this flood flow and no trouble appears to have been experienced by destructive overflow in the most extreme floods.

The Pennsylvania railroad proposes to fill the old canal from the point A to the point C on the map. There is no special objection to this, providing the old canal is cleaned from the point C to the culvert, 4,768 feet north, as proposed, as well as that culvert be made larger, and since in the agreement between the State of New York and the Pennsylvania railroad, the railway company assumes all responsibility as to drainage questions of every sort and kind, probably presentation of this matter to the railway authorities will be sufficient to insure that it is done. In any case, it should be done entirely at the expense of the railway. But if it is done, there should be in addition to the preceding, a sewer constructed from the point B, to the point A, in order to take the surface drainage which will pass down Elm street. There should also be an open ditch constructed along the south side of the old canal, from Genesee street, north, to the point C. The sewer from B to A may be made on a low grade of

0.2 foot to the one hundred feet and the ditch from Genesee street to the point C, may be made on a grade of 0.25 foot to the one hundred feet. With these several improvements properly carried out, the surface drainage of Cuba will be as satisfactory as it can be made except that such extraordinary improvements of the channel of Oil creek be gone into as outlined in the beginning of the report, but which are entirely beyond the financial ability of the village.

The surface drainage sewers have been roughly proportioned to carry off one half of the rainfall of 0.3 of an inch per hour, the supposition being that after such a rain has continued for some time, about one half will go immediately to the sewers. It is proper to say that this will not provide for extreme rainfalls, because we frequently have rainfalls of an inch per hour, which equals one cubic foot per second per acre. The area tributary to the Green street surface drainage sewer is about 43 acres. If we provided for a rainfall of one inch per hour, with one half running off, the sewer in Green street would require to be 35 inches in diameter, and even then there might be storms in which the runoff to the sewers would considerably exceed one half inch per hour per acre. Moreover, there is another reason why such provision in the present case is useless. The storm-water sewers all outlet into the creeks at the nearest point. Thus, the Green street sewer outlets into Tannery creek at Cemetery street; Mill street sewer into Griffin creek near Orchard street, and so on. By the time these sewers are running full, Tannery and Griffin creeks will be in flood flow and there will be consequently backwater from the creek into the sewer, thus making it impossible to realize the full benefit of larger sewers. Moreover, it may be pointed out that large sewers would become very expensive, and quite beyond the financial ability of the village. The surface drainage sewers, therefore, as proposed, will take care of all ordinary storms, but in an extreme storm they may be unable to care for it, but since the surface drainage through the gutters is left as it is, the extreme flows will pass off on the surface as at present, with the advantage that they will be drawn off immediately after the cessation of the storm, instead of as at present, standing in places for days. In order to assist the extreme flood

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flows, a number of pipes across streets have been included in the design.

The estimate herewith submitted, both for the separate system and for the surface drainage system, only includes sewers which seem to the writer necessary or desirable to construct at present. In the surface-drainage system, those not to be constructed at present are so marked, while in the separate system, sewers not included in the estimate are only those excepted by the board of trustees. In case the board of trustees should consider it desirable to include any of these, the writer will include them in the estimate on receiving a statement that it is desired to do so. The estimate of $40,600 for the construction of the separate system of sewerage may be termed an average estimate, based on the experience of the previous letting. The maximum estimate will be $42,600 and the minimum $38,600.

The estimate of $13,500 for the construction of the surface-drainage system is also an average estimate. The maximum will be $14,500 and the minimum $12,500. The maximum estimate for the construction of both systems will, therefore, be $57,100 and the minimum $51,100.

The drain in Genesee street, from Maple street to south of old Genesee Valley canal, and crossing Hardy and Maple streets to east, was examined and found to be in fairly good condition. This drain is, therefore, utilized for taking the Genesee street sewer, as shown on plan.

In case surface-drainage sewers are required in Bates avenue, Woodruff, Center, Corcoran and Genesee streets in the future, they may be run down directly to Oil creek in a manner similar to the sewer shown in Water street. It is not considered very probable, however, that surface drainage will be required in any of these streets except in Bates avenue, which will, of course, necessitate the construction of the Woodruff street sewer at some time in the future.

The surface drainage of a number of streets can be made satisfactory by grading the surface of the streets, as, for instance, Bull, Hardy, Maple and Mill streets may be made satisfactory in this way.

It is perhaps unnecessary to say that the sewerage works will require some attention, as will the drainage. The Pennsylvania

railroad should be required to keep that portion of Genesee Valley canal which receives Tannery creek in good condition; the brook to east of Mechanic street, will require cleaning; sewers will require flushing; all these will need more or less attention from an efficient superintendent.

It is proper to remark that the septic tank has been patented and that suits to determine the validity are now in process. In case the patents are upheld the village may be called upon to pay a royalty of perhaps 10 per cent. of the total cost of the septic tank and the sewers serving the same.

The septic tank as designed by Professor Landreth has a capacity of about 38,500 gallons, while the tank herewith submitted has a capacity of about 53,500 gallons. This tank may be used for 1,600 people, with an average daily flow of sewage of 70 gallons per capita, or the daily flow may amount to 112,000 gallons. The number of changes in the content of the septic tank which will take place is, therefore, roundly, two in twenty-four hours. This will probably effect a slight purification in warm weather, but in cold weather the sewage will go into the stream very nearly in the same state as when entering the septic tank. Should the village grow very materially, this tank must be either extended or else the slight purification effected will be deteriorated. The reasons for this view are too extensive to be gone into in this place and involve consideration of the entire theory of the septic tank.

In regard to the drains to be laid in connection with the separate system of sewers, it may be stated that in the revision the main drain has been reduced from 12 inches to 10 inches. This has been done because the test pits showed that on account of the large amount of water in Bishop street it would be desirable to take a drain for this portion directly into Tannery creek. For this purpose a six-inch drain will be laid in Bishop street, leading into Tannery creek, at the most convenient point. With the main drain relieved of the considerable amount of water carried by this drain, there does not seem to be any necessity for making it larger than 10 inches.

The following is the total estimated cost of this sewerage system:

ESTIMATED COST OF SEWERS (SEPARATE SYSTEM) AT CUBA, N. Y.

(A) Cost of Pipe and Specials.

3,780	lineal feet of 15-inch straight pipe, without specials, standard deep sockets, at 45c..	$1,776 00
100	lineal feet of 15-inch specials, at 92c.......	92 00
902	lineal feet of 12-inch straight pipe, without specials, deep and wide sockets, at 33c..	315 70
48	lineal feet of 12-inch specials, at 68c.......	32 64
1,610	lineal feet of 10-inch straight pipe, without specials, deep and wide sockets, at 26c..	418 60
140	lineal feet of 10-inch specials, at 51c........	71 40
980	lineal feet of 9-inch straight pipe, without specials, deep and wide sockets, at 21c..	205 80
80	lineal feet of 9-inch specials, at 41c.........	32 80
16,080	lineal feet of 8-inch straight pipe, without specials, deep and wide sockets, at 17c..	2,733 60
1,000	lineal feet of 8-inch specials, at 34c........	340 00
6,730	lineal feet of 6-inch straight pipe, without specials, deep and wide sockets, at 11c..	740 30
7,920	lineal feet of 6-inch straight pipe, standard sockets, at 9c........................	712 80
1,500	lineal feet of 6-inch specials, at 21c........	315 00
1,470	6-inch stoppers, at 3c.....................	54 10
		$7,840 74

(B) Cost of Drain Tile and Specials.

11,500	lineal feet of 3-inch drain tile, with collars, at $23.25 per M.....................	$267 38
12,000	lineal feet of 4-inch drain tile, with collars, at $34.05 per M.....................	408 60
1,640	lineal feet of 5-inch drain tile, with collars, at $44.85 per M.....................	73 55
4,230	lineal feet of 6-inch drain tile, with collars, at $61.05 per M.....................	258 24
1,600	lineal feet of 8-inch drain (second quality vitrified tile), at 12½c................	200 00

4,220	lineal feet of 10-inch drain (second quality vitrified tile), at 19c	$801 80
90	branches for drains (all sizes)	35 00
		$9,925 31
	Contractor's profit, 10 per cent	992 53
	Cost of pipe and drain at Cuba, N. Y. ...	$10,917 84
3,880	lineal feet of 15-inch pipe, laid, at 22c	853 60
950	lineal feet of 12-inch pipe, laid, at 15c	142 50
1,750	lineal feet of 10-inch pipe, laid, at 13c	227 50
1,060	lineal feet of 9-inch pipe, laid, at 11c	116 60
18,000	lineal feet of 8-inch pipe, laid, at 8c	1,440 00
16,150	lineal feet of 6-inch pipe, laid, at 6c	969 00
11,500	lineal feet of 3-inch drain, laid, at 2c	230 00
12,000	lineal feet of 4-inch drain, laid, at 3c	360 00
1,640	lineal feet of 5-inch drain laid, at 4c	65 60
4,230	lineal feet of 6-inch drain, laid, at 5c	211 50
1,600	lineal feet of 8-inch drain, laid, at 6c	96 00
4,220	lineal feet of 10-inch drain, laid, at 7c	295 40
9,600	lineal feet of trenching and backfilling, under 6 feet, at 20c	1,920 00
21,000	lineal feet of trenching and backfilling, 6 to 8 feet, at 26c	5,400 00
10,400	lineal feet of trenching and backfilling, 8 to 10 feet, at 35c	3,640 00
1,700	lineal feet of trenching and backfilling, 10 to 12 feet, at 50c	850 00
100	lineal feet of trenching and backfilling, over 12 feet, at 70c	70 00
100	cubic yards of rock in excavation, at $1.50 ..	150 00
12	net tons cast-iron pipe, at $40	480 00
74	manholes, at $42	3,108 00
18	flush tanks, at $50	900 00
20	lampholes, at $10	200 00
20,000	feet board measure hemlock lumber, at $30 per M.	600 00
10	connections with water system, for flushing, at $30	300 00

5	railway crossings, at $30	$150 00
	Masonry at end of drain and main sewer	60 00
	Sewage-disposal plant	3,200 00
	Contingent expense and engineering, about 10 per cent	3,638 46
	Amount	$40,600 00

ESTIMATED COST OF SURFACE-DRAINAGE SYSTEM.

760	lineal feet of 21-inch second quality standard pipe, at 63c	$478 80
1,870	lineal feet of 15-inch second quality standard pipe, at 34c	635 80
2,670	lineal feet of 12-inch second quality standard pipe, at 25c	667 50
5,360	lineal feet of 10-inch second quality standard pipe, at 19c	1,018 40
	Specials	75 00
		$2,875 50
	Contractor's profit, 10 per cent	287 55
		$3,163 05
760	lineal feet of 21-inch pipe, laid, at 30c	228 00
1,870	lineal feet of 15-inch pipe, laid, at 22c	411 40
2,670	lineal feet of 12-inch pipe, laid, at 15c	400 00
5,360	lineal feet of 10-inch pipe, laid, at 13c	696 80
25	manholes, at $35	875 00
12	lampholes, at $10	120 00
60	surface sewers (9-inch), at $32	1,920 00
20	surface sewers (10-inch), at $33	660 00
8	surface sewers (12-inch), at $35	280 00
4	blocks of masonry at ends of sewers	50 00
1,400	cubic yards deepening brook east of Mechanic street, at 40c	560 00
11,000	lineal feet of trenching and backfilling, at 20c	2,200 00
300	lineal feet of 12-inch cast-iron pipe across streets, at $1.75	525 00

10 blocks of masonry at ends of pipes across streets, at $20	$200 00
Contingent expense and engineering, about 10 per cent	1,210 25
Amount	$13,500 00

It is believed that the necessary further explanations are to be found in the accompanying specification.

Very sincerely yours,

GEO. W. RAFTER,
Consulting Engineer.

DANSVILLE.

Original Sewer Plans.

Original plans for a separate system of sewers and sewage disposal for the village of Dansville, Livingston county, were approved by the State Commissioner of Health on May 31, 1904, under the provisions of chapter 414 of the laws of 1897. The plans submitted for approval comprise:

A general sewer map of the village with contours, on a scale of 200 feet to the inch, printed as Plate XVII of this report.

A sheet of sewer details; on file, but not printed in this report.

A sheet of drawings for the disposal works, printed as Plate XVIII of this report.

A descriptive report of the system prepared by the designing engineers, Messrs. Knight & Hopkins, hereto appended.

Contract and specifications for the construction of the sewers and sewage disposal works; on file, but not printed in this report.

A continuous roll of sewer profiles; on file, but not printed in this report.

REPORT.

The village of Dansville, N. Y., is in the southeast corner of Livingston county and about 40 miles due south of the city of Rochester. It is the eastern terminus of the Dansville and Mount Morris railroad and is on the main line of the Delaware, Lackawanna and Western railroad, which passes along the northeastern boundary of the village corporation. The population of the village, as given by the national and State censuses, was as follows: In 1880, 3,625; in 1890, 3,758; in 1898, 3,902; in 1900, 3,633; in 1902, 3,815. These results show slight increase in population since 1880. The village is in a prosperous condition, and while there is no apparent reason for assuming any large increase in population, the prospects are good for a considerably better showing than has been made since the year 1880.

The village is supplied with water by gravity. The works were completed in 1897 and are owned by the village. The supply is abundant and the quality of the water is good. There are at present over 500 water connections, of which about one third are metered. In September, 1900, Mr. F. W. Dalrymple, associate member of the American Society of Civil Engineers, determined the daily water consumption to be about 215,000 gallons. The present daily consumption is variously estimated at from 250,000 to nearly 300,000 gallons.

Mill creek, a stream of considerable size, flows through the southern part of the village. This stream enters Canaseraga creek near the western corner of the village, less than a mile above the proposed sewage-treatment works, and above this point of entrance drains an area of about 40 square miles. The combined drainage area of Mill and Canaseraga creeks above the treatment works is about 200 square miles. In the very dry portion of the year 1900, weirings of Mill creek showed a run-off of about 140,000 gallons per mile daily. That year was an extremely dry one in that vicinity. If that rate of run-off should obtain for the combined drainage areas, there would be a dry weather flow in Canaseraga creek of about 28,000,000 gallons daily, or about 44 cubic feet per second. It is probable that the creek does not run materially lower than this. The Canaseraga creek flows from Dansville northwest for about 18 miles and

enters the Genesee river below the village of Mount Morris. The waters of the creek, so far as we know, are nowhere, between Dansville and Lake Ontario, used for potable purposes. The creek is of such size, even in the dry season, that no nuisance would be created by the discharge into it of the entire sewage of a village much larger than Dansville. Sufficient cases are recorded to demonstrate this. However, to meet the growing tendency of the times toward satisfying the requirements of the common law relative to the pollution of streams and the rights of riparian owners, and which the State Department of Health is forwarding by its requirements of sewer plans, the system designed for the village should provide for such a treatment as would render remote the danger from the use as a potable supply of the water of the creek after its dilution of the effluent from the sewage-treatment plant.

The site selected for the treatment works is near the westerly corner of the village and about 700 feet from Canaseraga creek. This point is, as to elevation, at the lower end of the village, and is hence the point to which the village naturally drains. No other point would be practicable for sewering the entire village, without resorting to pumping.

The method of treatment recommended and planned for Dansville is by bacterial treatment in a septic tank with the passing of the tank effluent over and through bacterial contact beds of coarse material. A consideration has been made of the various methods employed for sewage treatment for Dansville. Chemical treatment, while satisfactory as to quality of effluent if properly carried out, would involve a large annual expense for chemicals, attendance and other expenses of operation, while chemical treatment works would approach closely in first cost the works planned. The amount of land that would be required for broad irrigation would be difficult to obtain and then only at large first cost; and as the expense of preparing it would be large, the first outlay would be excessive. Treatment by intermittent filtration on especially prepared beds could be provided but the cost of the plant would exceed that by bacterial treatment, owing to the difficulty of procuring sufficient suitable material for the beds and the cost of preparing them; further, the cost of attendance would probably be much more than by the method proposed. In-

jury to the works by floods in the creek would likely be greater to filtration beds than to any other treatment plant that might be designed. It will be noticed that at the point of treatment the invert of the main sewer is only eight feet above the water surface of the creek in August, 1902, a time when the creek was at a fairly low stage. Inquiries in the vicinity resulted in the information that high water in the creek was about elevation 647. This is a somewhat sluggish stream below Dansville, its average fall per mile to Mount Morris being about six feet.

In designing the system the amount of sewage estimated to be cared for daily is taken at 300,000 gallons, being in excess of the present water consumption, and the possible growth of the town is kept in view by the size of the sewer mains and the arrangement of the works. The latter are arranged so that an increase in their size and hence capacity for treatment can be effected at somewhat less than a proportionate increase in cost. The septic tank is of such size as to hold an eight hours' flow at the rate of 400,000 gallons daily or about ten and one-half hours' flow at the rate of 300,000 gallons daily. The organic matter having become liquefied in the tank, the septic sewage passes to the receiving basin and is thence turned onto the bacterial beds in rotation, by automatic feeding apparatus set in the basin. There will be built in the end of each bed chambers in which will be set automatic timed siphons for discharging the sewage from the beds. The filling of the beds and the discharge of the same will be such that while one bed is filling, another is standing full, another emptying and the fourth standing empty. As required by the specifications for the works, the filling and discharging apparatus will be purchased by the village and set by the general contractor for the construction of the works. The contact beds are of such size that they will operate with three contacts or cycles daily when the quantity of sewage equals 300,000 gallons daily and with the voids in filtering material reduced to four-tenths of the cubic contents of the beds. The beds are of broken stone, two and six-tenths feet in depth. The distribution of the sewage onto the beds will be made through fifteen-inch, half-tile carriers imbedded in the broken stone. The sludge that will accumulate in the septic tank is to be pumped out when necessary, by means of a centrifugal pump driven by a

gasoline engine. There necessarily will be a considerable quantity of surplus excavation from the site of the tank and beds, and this surplus will be used in grading the surrounding ground and levelling a portion of it for use as a sludge bed upon which the sludge will be pumped and plowed under.

The treatment proposed should prove satisfactory as to cost of maintenance and quality of sewage effluent, and the plant would probably satisfactorily care for a very material increase in quantity of sewage over that estimated upon.

There are few cellars southwest of Main street that are wet in any season of the year, but between Main street and the north hill there are quite a considerable number of cellars that have water in them at times each year. While the sewers are deep enough to sewer the cellars, subsoil pipe in sizes of two to four inches in diameter and to the amount of 10,000 feet are contemplated for such localities as, on account of the high level of the ground water, need subsoil drainage.

The minimum diameter of sewer adopted for the system is six inches and the minimum grade for that size, except on four short lines, is seven-tenths of a foot in one hundred feet. The minimum grade for eight-inch sewers is five-tenths of a foot in one hundred feet. The table below gives the minimum and maximum grades in per cent. for the various sizes of pipe proposed and the approximate carrying capacities in gallons per twenty-four hours for the minimum grades:

Size.	Min. grade.	Capacity.	Max. grade.
6	0.6	240,000	20.0
8	0.5	480,000	5.0
10	0.4	840,000	1.6
12	0.3	1,150,000	0.5
15	0.4	2,550,000	0.4
18	0.25	3,200,000	0.5
24	0.15	5,100,000	0.15

The general village map will show where these grades and capacities occur. For intermediate grades, it may be stated that, for any size of pipe, doubling the grade increases the carrying capacity approximately fifty per cent. A comparison of the above table with the village map should show to one acquainted with the

village and the probable amount of sewage on any street that the sizes proposed are ample for all future needs, although the smaller sizes so largely predominate. The natural grades in the village being generally so excellent, large sewers are needed in but few places. These natural grades and the contour of the village have enabled the system to be designed without excessive cuttings, there being only 400 feet of trenching greater than 14 feet in depth, of which all but 10 feet is less than 16 feet deep. Of the total mileage of the system, the large majority of it is in trenches less than 10 feet deep.

There are 73 flush tanks planned for the entire piping system. These tanks empty automatically and are arranged to be adjusted to do so as often as required. They are for the purpose of cleansing such pipe as are necessarily larger than theoretical calculations of the sizes necessary to carry the sewage would require, as well as for keeping clean other parts of the system until such time as the sewage flow becomes sufficient for self cleansing. Of the total number of tanks 54 are on the sewers intended for immediate construction.

It is not contemplated that roof water shall be admitted to the system; but it might properly be allowed in a few places for flushing the upper ends of the system, where the village water-mains do not reach, until such time as the use of those sewers would render unnecessary the admission of such roof water. Any permit to connect a roof with the system should provide that the village shall have the right at any future time to require the connection severed.

We estimate that the flow in the outlet sewer will reach in a few years a total of 300,000 to 400,000 gallons in 24 hours, including the inflow of ground water, and that the maximum rate during some period of the day may reach 800,000 gallons. This will give a velocity in the 24-inch outlet of two feet per second, with the sewer carrying one-sixth its capacity.

There are about ten miles of six and eight-inch sewers, and about four of sizes larger than eight inch.

In the designing of the system the general assumption has been made of a maximum rate of flow of 132,000 gallons per mile of sewer for the six and eight-inch sewers, largely on account of their being so immediately affected by the flush tanks. The

assumed flow for the larger sizes is made on the basis of a maximum of 52,800 gallons per mile of sewer. These assumptions would make the maximum rate at the outlet about double the above stated 800,000 gallons, and consider the sewers running one third full.

Calculations of flow in the sewers are based on Kutter's formula with n equal to 0.013.

The consideration of the sewers running one third full does not apply to the six-inch sewers, and in a few places not to the eight inch; and in certain places larger sizes are used than the assumptions would bear out, as on Elizabeth and Main streets, where the flow comes from closely built up or business sections, as well as in places where there is prospect of growth of the village.

On account of the heavy grades on the hillside and the probability of that portion of the village building up slowly, there are no sewers larger than six inches in diameter planned for that section.

There are 38 lampholes designed for the system, into each of which a hose can be inserted for flushing when necessary. These lampholes are used in the place of manholes for inspection purposes, to save the expense of the more costly manholes. They are placed only between two manholes. The flush tanks are also designed with an overflow pipe which answers the purpose of a lamphole. Through the manholes there is thus obtained at any time perfect inspection of the entire bore of the sewers, since either a manhole or a lamphole is placed at every change of grade or alignment.

We believe that with one exception there are no houses along the sewer lines opposite which the sewers are not sufficiently deep to provide for sewering the cellars.

The number of houses not provided with sewerage facilities is very few. On Gibson street south of Cemetery street and South street south of Mill creek, there are a few houses, generally farm houses, that it was not practicable to include in the system. Besides these there are one house on South street north of Mill creek, one house on Red Jacket street (a private road), a farm house on Main street north of Maple street, and a farm house near the west end of Ossian street, that are not along proposed sewer lines and which it was not practicable to sewer into

the system. These houses are shown on the map and we believe these are all the houses within the corporation not sewered.

Respectfully submitted,

KNIGHT & HOPKINS,

Civil Engineers.

DOLGEVILLE.

CHANGES IN SEWER GRADES.

Original plans for a system of separate sewers and sewage-disposal works were approved by the State Board of Health on February 22, 1898, in accordance with the provisions of chapter 414 of the laws of 1897, and appear in the nineteenth annual report.

Plans for an entirely revised system of separate sewers and for a different system of sewage disposal were approved by the State Commissioner of Health on December 23, 1903, in accordance with the provisions of chapter 414 of the laws of 1897, and appear in the twenty-fourth annual report.

On August 25, 1904, the State Commissioner of Health approved a plan for changes in the sewer grades on Helmer avenue, Van Buren and State streets, in accordance with the provisions of chapter 414 of the laws of 1897.

A map and profiles of the streets on which changes were approved are printed as Plate XIX of this report.

EAST SYRACUSE.

REVISED PLANS FOR SEWAGE DISPOSAL WORKS.

Original plans for a system of separate sewers and sewage disposal works for the village of East Syracuse, Onondaga county, were approved by the State Board of Health on December 21, 1900, in accordance with the provisions of chapter 414 of the laws of 1897, and appear in the twenty-first annual report.

On November 11, 1904, the State Commissioner of Health approved plans for a thoroughly revised system of sewage-disposal works, in accordance with the provisions of chapter 414 of the laws of 1897. The plans submitted for approval comprise:

A map of the location of the receiving well, force main and disposal grounds, with a profile of the force main and of the effluent line from disposal works to point of discharge into Butternut creek, printed as Plate XX of this report.

A sheet of drawings of the receiving and pumping station, septic tanks and sludge bed, printed as Plate XXI of this report.

A drawing of the filter beds of the disposal system, printed as Plate XXII of this report.

A drawing of the automatic siphons for automatically dosing the filter beds in rotation, printed as Plate XXIII of this report.

A drawing of manhole cover and rim; on file but not printed in this report.

A descriptive report of the revised sewage-disposal system prepared by the designing engineer, Mr. W. S. Farrington, dated October 6, 1904, hereto appended.

Contract and specifications for the construction of the disposal works; on file but not printed in this report.

REPORT.

Plans for a system of sewers for the village of East Syracuse were approved by the Department of Health on December 21, 1900, and the system with the exception of the disposal plant is now under construction and nearly completed.

Amended plans for the disposal works and also of a change in the design of the receiving well are presented herewith for approval.

The population of East Syracuse in 1890 was 2,231, in 1900 it was 2,509, and at present about 2,700, showing a slow but substantial growth.

The receiving well which is now under construction, and as shown on the amended plans consists of two chambers, each having a capacity of 7,350 gallons and so arranged that either or both chambers may be used in connection with either or both of the pumps. This design permits of cleaning out the wells and the repairing of either of the pumps or motors, without interrupting the flow of sewage. In connection with this receiving well into which the sewage from the entire village flows by gravity, is a pumping chamber in which are to be placed two vertical double-suction centrifugal pumps, each to be operated

by separate electric motors direct connected by vertical shaft. The sewage is pumped from the receiving well through an eight-inch cast-iron force main to the septic tank and filter beds, located on the Town Line road, about 8,300 feet easterly from the receiving well. The effluent from the filter beds passes through a ten-inch vitrified tile pipe and discharges into Butternut creek. The relative location of the receiving well, disposal plant and Butternut creek are shown on the general plan.

The waters of Butternut creek are nowhere used for domestic purposes, and the volume of water flowing during low water stage, as determined by measurements by the writer in August, 1900, and confirmed by later observations, is about 30 cubic feet per second or 13,300 gallons per minute. Butternut creek flows into Oneida lake, which is approximately 15 miles north of the proposed point of discharge.

The water of Butternut creek can all be, and is partially diverted into the Erie canal feeder at a point about three and one-half miles above the proposed location of the discharge for the effluent pipe. However, the water is never entirely diverted at this feeder and the quantity given above fairly represents the average low water flow. The water not diverted into the feeder is further increased by the drainage of about ten square miles of watershed tributary to this stream between the feeder dam and the proposed point of discharge and also by the canal overflow and leakage at the aqueduct where the canal crosses above the channel of Butternut creek and by canal leakage at other points.

The proposed location of the septic tank and filter beds was selected as offering the most economical place available, having sufficient elevation above high water to operate the disposal plant by gravity and to discharge the effluent into Butternut creek. Further it is located so as not to interfere with dwellings and in a place where additional land can be readily acquired for future extensions if necessary and where sand and gravel may be obtained.

It is estimated that 100,000 gallons per day will be the maximum flow of sewage during the first two years. It is proposed at present to build one septic tank holding 75,000 gallons and four filter beds each having a net filtering area of .09 acres. The dimensions and arrangement of the septic tank and filter

beds with their appurtenances are shown by the plans. The septic tank is designed to care for 100,000 to 150,000 gallons per day, allowing from 12 to 16 hours for the sewage to pass through the tank. The filter beds are designed normally to filter 100,000 gallons of sewage per day operating at the rate of 350,000 to 400,000 gallons per acre per day.

As there are wet trenches in the system, considerable ground water may develop and it is estimated that while the disposal plant is designed normally to care for 100,000 gallons of sewage per day, its possible maximum capacity would be to care for 50,000 gallons of ground water additional.

The eight-inch cast iron force main delivers the raw sewage into either one or both of the grit chambers, where the mineral matter is deposited and retained. Valves are provided enabling either grit chamber to be cleaned out while the other is in use, without in any way interrupting the flow of sewage into the septic tank proper.

From the grit chambers, the sewage passes through the 12-inch cast iron pipe opening into the septic tank where in passing through, it is retained for a period of from 12 to 16 hours, or for sufficient time for the proper bacterial action to take place, depending on the character of the sewage. The effluent then passes over an aerating weir into the effluent well or "dosing" chamber. This effluent well is designed to hold about 8,000 gallons. When the effluent in the dosing chamber reaches a depth of four feet, it is discharged automatically onto the filter beds in rotation by means of a group of triple alternating siphons arranged as shown on the plans.

The siphons shown on the plans are known as the Adams automatic, triple-alternating siphons. These are recommended because of their simplicity of construction and the certainty of their operation. It is intended that these siphons, as well as the pumps and electric motors, with the automatic appliances, be furnished by the sewer commissioners and to be installed by the manufacturers or under their directions and under a guarantee assuring satisfactory operation. It is very important that these appliances be carefully selected and it is believed that the sewer commissioners will be in better position to secure the best ap-

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paratus if made a matter of separate contract than would be the case if they were to be furnished by the contractor who performs the work of construction.

The three siphons, arranged as shown, are set in the same tank and at the same elevation. The depth of water that a siphon will draw depends upon the depth of the trap of said siphon, consequently a siphon that has a full trap will draw more water than a siphon whose trap is only partially filled. A portion of the water is forced out of the trap of the siphon by the water rising in the tank and when three or more siphons of the same size and style are set at the same elevation and in the same tank, the rise of water in the tank will force out of the traps of each one of the siphons, a portion of its water, thus weakening the seal of each siphon trap in the tank. When one of the siphons is brought into operation the other two siphons will remain idle and at the next rise of water will both have less water in their traps than they had originally. In the triple alternating siphons, connections are made and means supplied by the manufacturer for refilling the traps of the siphons except the siphon that it is desired to next bring into operation, thus enabling the three siphons to discharge in rotation.

By means of this arrangement the sewage is discharged onto the three filter beds in rotation, one bed being held in reserve. The arrangement of the pipes and valves permits the use of any three of the filter beds to be used in connection with the three siphons, as well as allowing any one of the four beds to be held in reserve. After passing through the filter beds, the effluent passes into Butternut creek by the system of piping, as shown.

The dosing chamber has a capacity of about 8,000 gallons and will fill in an hour and a half or two hours. The siphons are designed to discharge at the rate of 15 gallons per second. Each of the three filter beds will receive a dose about once in every five or six hours.

The grit wells and septic tank can be cleaned out by use of hose connected with the force main by using the sewage or by temporary connection between the city water and the force main. In cleaning out either grit wells or septic tank, the flushing will flow by gravity through the drain pipe to the sludge bed located at the northeasterly corner of the disposal field. The drainage

of this sludge bed is connected with the 10-inch drain effluent pipe extending to Butternut creek. The sludge will be washed on to the bed and the liquid allowed to filter through it. The solid matter after becoming dry can be raked up and burned or otherwise disposed of.

Valves are provided in the force main at Butternut creek that will enable the sewage to be pumped direct into the stream in case it is necessary or desirable to do so temporarily for any reason or when necessary to clean the tank. These valves also provide a means for "blow-off" for the force main.

Electric motors and pumps are designed to be started and stopped automatically, and so arranged that with one pump working the other pump would start if the sewage rises faster than the first pump can care for. The electrical appliances for this purpose, consisting of a self-starter, float switch and float, are to be furnished by the village in connection with the motors and pumps, outside of the regular construction contract. It is very important that great care should be used in selecting these appliances in order to make sure of certainty of operation. No recommendation of any particular manufacturer's appliance is made, but the sewer commissioners who will have in charge the purchase of the same should insist upon the manufacturer giving full details and specifications, with a guarantee as to quality and operation, before such purchase is finally decided upon.

The electric motors designed to be used are each 5 horse power, 200 volts, 900 revolutions per minute.

The pumps are to be vertical, double-suction, centrifugal pumps, one two-inch pump for regular service, having a capacity of 200 gallons per minute, and one four-inch pump for emergency and future service. In connection with the installation of the pumps, proper screens are to be provided and the discharge so regulated that the delivery of the raw sewage into the septic tank will be uniform.

In regular use the two chambers of the receiving well as well as the two chambers of the grit well will be used as one chamber. However, in cleaning or in making repairs the separate chambers will be advantageous.

Whenever the amount of sewage exceeds 100,000 gallons per day, or the capacity of the one septic tank and its filter beds,

then it is proposed to add another tank of like design, together with another group of filter beds sufficient to take care of the increased volume of sewage.

Respectfully submitted,

W. S. FARRINGTON,

Engineer.

SYRACUSE, N. Y., *October* 6, 1904.

FRANKFORT.

ORIGINAL PLANS FOR SEWERS AND SEWAGE DISPOSAL.

On July 6, 1904, the State Commissioner of Health approved an original set of plans for a system of separate sewers and sewage-disposal works for the village of Frankfort, Herkimer county, in accordance with the provisions of chapter 414 of the laws of 1897. The plans submitted comprise:

A general contoured sewer map of the village, printed as Plate XXIV of this report.

A sheet of drawings of the sewage-disposal works, printed as Plate XXV of this report.

A drawing of a special manhole to be used in connection with the sewage-disposal works, printed as Plate XXVI of this report.

A drawing of sewer details; on file, but not printed in this report.

A roll of sewer profiles; on file, but not printed in this report.

A descriptive report of the system of sewers and sewage disposal, prepared by the designing engineers, Messrs. Knight & Hopkins, hereto appended.

Contract and specifications for the construction of the system of sewers and sewage disposal; on file, but not printed in this report.

REPORT.

The village of Frankfort, Herkimer county, N. Y., is situated on the south side of the Mohawk river about nine miles east of the city of Utica. Its present population is about 2,800, an

increase since 1898 of about 400. In 1890 its population was 2,291, or about double that of 1880, the cause of this increase being due to the erection in the village of the West Shore railroad shops, and the slight growth between 1890 and 1898 being due to the removal from Frankfort of these shops. The village has now largely recovered from the loss of that industry and will probably show a slight growth in the future, although in all probability not a large one. Moyer creek flows northwestwardly through the village and enters the Mohawk river within the corporation limits.

The village was incorporated in 1862 and covers an area of about one square mile. It is comparatively level, except at its south and southwest portions, but slopes generally to the northwest toward the Mohawk river.

The village has as railroad facilities the New York Central and Hudson River railroad, which passes near the northern boundary; the West Shore railroad, and the Utica and Mohawk Valley electric railroad. It owns its own waterworks, which furnish the village with an adequate supply of excellent water by gravity from the hills to the south at a pressure of nearly 100 pounds per square inch. The consumption of water is not known with any degree of accuracy, but it is probably not far from 175,000 gallons daily. The waterworks was constructed in 1894 and the water is quite largely used for domestic purposes.

As is well known the Mohawk river drains a large area above Frankfort and is a stream that furnishes a flow, even in the dry seasons, adequate to receive the untreated sewage of many places of the size of Frankfort, without any appreciable nuisance to the eye or sense of smell. It is desirable that the system designed for the village should provide for such a treatment of the sewage as would prevent any further pollution of the Mohawk river. Hence the plans provided for the treatment of the sewage in a covered septic tank and the further treatment of the tank effluent on contact beds. The site selected for the treatment works, near the west end of William street, we believe to be the most practicable site that can be found. Surveys were made for the purpose of determining the advisability of locating the works near the river at the north end of Railroad street and also farther east down the river by an outlet line from a point near the inter-

section of William and "B" streets, but it was found that the fall in the river is very slight, being only a few inches, and that the gain in fall would be many times lost in the increased distance to be gone to the point of outfall, besides quite largely increasing the cost of the system. The septic tank is of a size sufficient for holding 85,000 gallons, which is the equivalent of eight hours' flow of sewage at the rate of 255,000 gallons in 24 hours—a rate about 50 per cent. in excess of the estimated present water consumption. After the liquefaction of the organic matter of the sewage in the septic tank the overflow passes through a 16-inch pipe to a small receiving basin built in one end of the contact beds. Automatic sewage feeds will be placed and if necessary housed in the receiving basin, by which the tank effluent will be emptied in rotation upon each of the four contact beds in such a manner that the filling of one bed will be in progress while one bed is emptying, another standing empty and another standing full. As soon as one bed is filled the discharge from the receiving basin will be changed to the empty bed and so on through the four beds in rotation. The discharge from the beds will be made by automatic-timed siphons, one for each bed, which will retain the sewage on a bed for the required length of time. These siphons will be placed at the north ends of the beds and will discharge into the 15-inch drain leading to the Mohawk river. The automatic feeds and timed siphons will be purchased by the village and set by the contractor for the construction of the works. The contact beds are of such size that they will operate with ten-hour contacts or cycles with a flow of 250,000 gallons per 24 hours, and when the voids in the filtering medium become equal to about three-tenths of the cubic contents of the beds. It is contemplated that the sewage shall be retained on the beds by the timed siphons a period of two and one half hours and that the period of discharge shall be one hour, when the beds are working under normal conditions. During the early operation of the works the periods of filling and resting will both be lengthened, but when the daily flow equals 250,000 gallons the time of filling will be one and one half hours and that of resting two hours. Provision is made in the timed-siphons specifications for changing the time of retaining the sewage on the beds in case such change might be desirable for bettering the quality

of the effluent. The beds are filled to a depth of three feet with coke broken to the specified size and the effluent from the septic tank is turned on to the beds through 15-inch vitrified half-tile carriers sunk into the surface of the filtering material. The sludge that will accumulate in the bottom of the septic tank and grit chamber will be pumped out as occasion requires from the pump well, to which it will be drawn through the pipe leading from the sludge pit to the well. The sludge will be pumped on to the ground adjoining the works and will be plowed under, and it is recommended that a considerable area of land be purchased adjoining the works in addition to that required for the septic tank and beds.

To provide adequate sewerage facilities for the northern portion of the village, it is evident from an inspection of the plans and the profiles that at some short portion of the year either pumping must be resorted to or else the sewers in the lower portions of the village will become flooded. The effort has been made to design the system so that the periods of tendency to backflow will be short and we have been able to design the system so as to provide sewerage facilities everywhere, except in the few instances noted elsewhere. Maximum high water in the Mohawk occurs at about elevation 396. For most portions of the year the river elevation is below 383 and the contact beds will operate perfectly until the river reaches about elevation 384, when they will operate automatically and more or less perfectly as the river rises until it reaches elevation 387 or thereabouts, when the automatic operation of the beds would cease. The beds could be kept in perfect and automatic action between elevations 384 and 387, if necessary, by operating the pump so as to pump the bed effluent to the 20-inch outlet line, as would be contemplated during all stages of the river between 387 and 390. Should the river rise above elevation 391, which would be a considerable flood, there would be a tendency for the pressure of the ground water to raise and hence injure the beds. To prevent this a 10-inch pipe extends through the earth embankment that surrounds the beds and will admit the flood water on to them—the valve on this pipe being kept open. Upon the water rising to this point the sewage may be drawn from the septic tank to the well and there either pumped direct to the

river or through the six-inch pipe leading from the pumphouse to the beds, and thus keep the water line above the beds the same as the flood outside the embankment. As the periods of flood are of short duration, the amount of water used to operate the pump would not be large and would be consumed at such times as there would naturally be an abundant water supply.

We believe this method of treatment will be entirely satisfactory, both as to cost of maintenance and quality of effluent. And in addition the sewer mains will be at all times in the most perfect order and their operation not affected by river floods.

Subsoil pipe in sizes of two to four inches and to the extent of 9,000 feet are contemplated for the system, since there are some cellars which especially need drainage on account of the level of the subsoil water being high at times. The soil within the village is largely of gravel and hence admits freely the passage of the ground water.

The minimum diameter of sewer adopted for the system is six inches, and the minimum grade for that size is six-tenths of a foot in 100 feet. The minimum grade adopted for eight-inch sewers is forty-five one-hundredths of a foot in 100 feet, which occurs on only one short line, all others being five-tenths or greater. The table below gives the minimum and maximum grades in per cent. for the various sizes of pipe proposed and the carrying capacities in gallons per 24 hours for the minimum grades:

Size.	Min. Grade.	Capacity.	Max. Grade.
6	0.6	240,000	3.0
8	0.45	450,000	10.0
10	0.25	660,000	0.4
12	0.25	1,050,000	0.4
15	0.25	2,000,000	0.25
18	0.2	2,790,000	0.2
20	0.15	3,600,000	0.15

These capacities are based on Kutter's formula, with $n=0.013$. The general village map will show where these grades and capacities occur. For intermediate grades it may be stated that doubling the grade increases the carrying capacity approximately 50 per cent. A consideration of the above table with the village

map should show to one acquainted with the village and the probable amount of sewage on any street that the sizes proposed are ample for all future needs, although the smaller sizes so largely predominate. There are about eight and one-quarter miles of sewers in the complete system, of which the larger part is in trenches less than nine feet deep and there are no very heavy cuts, the deepest being less than 18 feet.

In determining the sizes of pipe for the system the maximum flow of sewage and ground water was assumed at 25 gallons per lineal foot of sewer for the six and eight inch sewers and 10 gallons per lineal foot for sewers larger than eight inch. This excess of 15 gallons is assumed as resulting from the intermittent operation of the flush tanks, which directly greatly affects the maximum flow in the two smaller sizes of sewers. This assumption is only a general one, exceptions to it being made to satisfy a number of local requirements, such as on Elizabeth, Cemetery, Litchfield, Sheldon and William streets, where extensions or lateral sewers are likely to be constructed in the future and require larger sizes, or as in the business section of the village, where the sewage flow per lineal foot will necessarily be large. The above assumptions would make the maximum sewage flow at the treatment works about 900,000 gallons, or nearly double the estimated maximum daily rate based upon twice the average water consumption plus ground water, the former being taken at 200,000 gallons and the latter at 50,000 gallons daily, a total of 250,000 gallons for which the treatment works are designed.

As the smaller sizes of pipe are necessarily considerably larger than any theoretical estimate of the sizes required to carry the sewage would make necessary, it is for the purpose of keeping clean such pipe that the construction of 39 flush tanks is recommended for the system. These flush tanks empty automatically and as often daily as required and so adjusted.

The admission of roof water into the sewers is not contemplated, but might be allowed in a few places for flushing the upper ends of the system until such time as the use of those sewers would render unnecessary the admission of the roof water. Any permit to connect a roof with the system should contain a clause giving the village the right at any future time to require the connection severed. The admission of roof water might be

especially desirable for a time at the few ends where the water mains are not sufficiently convenient for supplying water to the tank.

There are designed for the system 12 lampholes, into each of which a hose can be inserted for flushing when necessary. These lampholes are used in the place of manholes for inspection purposes to save the expense of the more costly manholes. They are placed only between two manholes. The flush tanks are also designed with an overflow pipe, which answers the purpose of a lamphole. Through the manhole there is thus obtained at any time perfect inspection of the entire bore of the sewer, since either a manhole or a lamphole is placed at every change of grade or alignment.

The number of houses not provided with sewerage facilities is unusually few. We believe there are only five, and these are the farmhouse at the west end of Main street, the farmhouse near the west end of the corporation and south of the Erie canal, and the three houses on the south side of the Erie canal lock No. 45, on State or private property.

There are four houses along the sewer lines opposite which the sewer is not deep enough to provide for sewering the cellars; three of these are in the hollow on West Main street, where the providing of cellar sewerage by the system is not practicable; the fourth one is the hotel on the southeast corner of Litchfield street and Pleasant avenue.

Respectfully submitted,

(Signed) KNIGHT & HOPKINS,

Civil Engineers.

FULTON.

REVISED PLANS FOR A SYSTEM OF SEPARATE SEWERS AND SEWAGE-DISPOSAL WORKS.

Original plans for a system of separate sewers and for future disposal works for the (then) village of Fulton, Oswego county, were approved by the State Board of Health on December 28,

1894, in accordance with the provisions of chapter 375 of the Laws of 1889, and appear in the fifteenth annual report.

On August 25, 1904, the State Commissioner of Health approved a revised set of plans for separate sewers and for a different system of sewage disposal for the west side of the city of Fulton, in accordance with the provisions of chapter 468 of the laws of 1903, regulating the discharge of sewage from cities into the waters of the State. These plans comprise:

A general sewer map of the west side of the city of Fulton, printed as Plate XXVII of this report.

A drawing of receiving and pump well, printed as Plate XXVIII of this report.

A drawing of the septic tank, building and sludge bed, printed as Plate XXIX of this report.

A sheet of plans for the filter beds of the disposal plant, printed as Plate XXX of this report.

A drawing of the automatic siphons for discharging the effluent from septic tanks on to the filter beds in rotation; on file and not printed in this report, but practically identical with Plate XXIII of this report.

Three sheets of sewer profiles; on file, but not printed in this report.

A sheet of sewer details; on file, but not printed in this report.

A descriptive report by the designing engineer, Mr. W. S. Farrington, dated August 15, 1904, together with a schedule of the estimate of sewage to be contributed from the different streets, hereto appended.

Contract and specifications for the construction of the sewers and sewage-disposal works; on file, but not printed in this report.

REPORT.

The city of Fulton is situated on both banks of Oswego river at a point about twenty-five (25) miles north of Syracuse and eleven (11) miles south of Oswego, where the river flows into Lake Ontario. The portion of Fulton situated on the east bank of the river has a sewer system, the outlet of which empties directly into the river. This sewer system was built in 1896. That part of Fulton situated on the west bank of Oswego river was formerly the village of Oswego Falls. It was incorporated

as part of the city of Fulton some two or three years ago. A design for a sewer system for this part of Fulton is the basis of this report.

The west side of Fulton lies on a ridge between Oswego river and Lake Neahtahwanta. The ground slopes both toward the river and toward the lake, the summit of the ridge being situated about midway between them. The river bank is very steep and high, and along the river are situated the American Woolen Mills and a paper mill. The ground slopes more gently toward the lake. The lake is a fine body of water, clear, cold and with a sandy or gravel bottom. It is fed by springs in addition to its drainage area and is of almost constant volume. The outlet from this lake, called Outlet creek, is a stream of considerable volume and joins Oswego river about one and one half or two miles north of the city limits.

That portion within the city limits lying to the west of the Delaware, Lackawanna and Western railroad and to the south of Cedar street is farming land, and no streets are opened up in this territory. Hannibal street runs into a country road, with houses as far out as C street. No attempt is made to show a system of sewers for the territory included in the above-mentioned district, as it is mostly farm land and entirely unimproved, with little likelihood of sewers being required for many years.

The population of the west side of Fulton was 2,925 in 1900 and 1,821 in 1890.

The watershed of Oswego river at Fulton is 4,900 square miles and the spring floods in the river vary from 19,500 cubic feet per second to 42,000 cubic feet per second, the ordinary spring flood being about 17,700 cubic feet per second. The minimum flow of the river is about 1,000 cubic feet per second.

The city owns and operates its own waterworks, which is situated in a southerly direction from the town. An adequate supply is obtained from springs. The water is pumped into a steel tower and distributed to both sides of the city. At the present time the west side is using about 200,000 gallons per day. There are no paved streets on the west side of the city. The business portion of the town is situated along Broadway.

Sewers have been built in the following streets: Pine street, from Second street to river; Broadway, from Second street to

river; Voorhees street, from Second street to river; Fourth street, from Kellogg street to Hart street; Hart street, from Fourth street to river; and in the alley between Riverside street and First street, from Broadway to Leitch street. The system of sewers is designed without any reference to these old sewers. It is not anticipated that any of them can be made of use in the present system, and they are therefore not made a part of this system. The houses which are connected with these old sewers can connect with the new sewers, with little extra expense, and thus prevent the little sewage which discharges from them from being delivered into the river raw, as it is now.

The system is designed to take care of the house sewage only. In designing the sizes of the sewers, 10 persons have been allowed for every fifty (50) feet of street, and 100 gallons of sewage for each person. This results in 20 gallons per day for each lineal foot of sewer. The sewers are designed of such a size as to carry all the sewage of the territory covered by the system in 16 hours, together with 10 per cent. of the maximum flow allowed for ground water when running half full. The velocity of flow is not allowed to fall below two feet per second when the pipe is running half full. This velocity is computed by Kutter's formula, using a coefficient of roughness equal to .013. Using the minimum grades as given on the drawings, the different sizes of pipe will carry the following number of gallons in 24 hours when running half full:

6-inch pipe	127,000 gallons
8-inch pipe	237,000 gallons
10-inch pipe	441,450 gallons
12-inch pipe	584,000 gallons
15-inch pipe	946,000 gallons
18-inch pipe	1,294,000 gallons
20-inch pipe	1,594,000 gallons

Sewers have been placed in all the opened streets, whether they are built upon or not. The system will take care of a population of 11,000 people, which is several times larger than it will be called upon to serve for many years. Many of the cross streets in which sewers are shown may never need them, as the houses face on the streets running north and south.

In designing the sewer system the present situation and the future growth of the west side of Fulton was taken into consideration. Also, the topography of the ground was looked over carefully, and it was deemed advisable to locate the disposal works at the northerly side of the city. One main or trunk sewer following as nearly as possible the lowest points on the ground was designed to run from the southerly side of the city to the disposal works at the north side. All the other sewers are tributary to this main sewer. In crossing the divide between the lake and the river this main sewer is 30 feet deep, but this maximum cut is not long. The sewers are all placed at a depth sufficient to drain basements.

The whole sewer system, with one exception, is designed to drain toward the disposal works. This one exception is the part of Hannibal street lying west of Outlet creek and that part lying east of Outlet creek bounded by Walradt street on the north, Fifth street on the east and Worth street on the south.

Outlet creek is the natural drainage outlet for this territory. This stream, which is the outlet of Lake Neahtahwanta, is of quite constant volume, ranging from 15 to 20 feet in width, from 2 to 4 feet deep and with a velocity varying from 1 to 3 feet per second. This creek has numerous rapids, and the distance from Hannibal street to where it joins the Oswego river is from one and one half to two miles. Outlet creek flows through a deep ravine to its junction with the river north of the city.

At the present time there are 36 houses in the above described territory. Outside of the streets where sewers are shown, the territory is devoted to farming and is not likely to be built up for some time.

In order to prevent discharging the sewage into this stream, a receiving and pump well is located on Hannibal street just west of Outlet creek, into which the sewers for this territory are planned to discharge. A four-inch centrifugal pump operated by an electric motor is designed to pump the sewage from this well through a four-inch cast-iron pipe through Hannibal street easterly to the head of the sewer just east of Fifth street, from which point it flows by gravity through the Hannibal street sewer to the main outlet.

Roof water may be admitted into the sewers under the control of the Board of Public Works, while the system is new, but the amount of this water admitted must not materially increase the quantity passing through the disposal plant. Automatic flush tanks of 400 gallons capacity are to be placed at the ends of sewers. Manholes are provided at street intersections and at changes of grade and angle points. As the ground is so rolling it is not anticipated that much ground water will reach the sewers, although 10 per cent. of the maximum flow has been allowed for water entering the sewers from this source.

The disposal works are situated as shown on the map and consist of one septic tank holding 75,000 gallons, filter beds, a sludge bed and a building over the grit wells, and a distributing chamber to the filter beds.

It is estimated that not more than one third of the population will make sewer connections for the first two years, and that 100,000 gallons per day will be the maximum flow during that time. The septic tank will take care of this flow and will retain the sewage for an average period of 18 hours. When the rate of flow goes beyond the above amount, additional septic tanks will have to be built. The filter beds are designed to filter 100,000 gallons per day, operating at the rate of 350,000 to 400,000 gallons per acre per day. The disposal plant as shown is intended for the first installation only or to care for approximately 100,000 gallons of sewage per day. When the amount of sewage exceeds this amount, additional septic tanks and filter beds will be provided on the ground adjacent, which is to be secured for this purpose.

The sewage passes from the main outlet sewer into one of the grit chambers, where the mineral matter is deposited and retained. The organic matter and liquid pass on into the septic tank either over the weir or through the 12-inch cast-iron pipe. In the septic tank the sewage is designed to be retained for a period of from 16 to 18 hours or for sufficient time for the bacterial action to take place, by which action the solid matter is liquified. The effluent then passes over an aerating weir into a discharging or dosing chamber. When the liquid in this chamber reaches a depth of four feet it is discharged automatically

on to the filter beds in rotation by means of a group of triple alternating siphons, arranged as shown on the plans.

The siphons shown on the plans are known as the Adams automatic triple alternating siphons. These are recommended because of their simplicity of construction and the certainty of their operation. It is intended that these siphons, as well as the flush tanks, pump and motor, be furnished by the city to the contractor. It is very important that these appliances be carefully selected, and it is believed that the city authorities will be in better position to secure the best apparatus if made a matter of separate contract than would be the case if they were to be furnished by the contractor who performs the work of construction.

The three siphons, arranged as shown, are set in the same tank and at the same elevation. The depth of water that a siphon will draw depends upon the depth of the trap of said siphon, consequently a siphon that has a full trap will draw more water than a siphon whose trap is only partially filled. A portion of the water is forced out of the trap of the siphon by the water rising in the tank, and when three or more siphons of the same size and style are set on the same elevation and in the same tank the rise of water in the tank will force out of the traps of each one of the siphons a portion of its water, thus weakening the seal of each siphon trap in the tank. When one of the siphons is brought into operation the other two siphons will remain idle and at the next rise of water will both have less water in their traps than they had originally. In the triple alternating siphons connections are made and means supplied by the manufacturer for refilling the traps of the siphons, except the siphon that it is desired to next bring into operation, thus enabling the three siphons to discharge in rotation.

By means of this arrangement the sewage is discharged on to the three filter beds in rotation, one bed being held in reserve. The arrangement of the pipes and valves permits the use of any three of the filter beds to be used in connection with the three siphons, as well as allowing any one of the four beds to be held in reserve. After passing through the filter beds the effluent passes into the river by the system of piping as shown.

The dosing chamber has a capacity of about 8,000 gallons and will fill in an hour and a half or two hours. The siphons are designed to discharge at the rate of 15 gallons per second. Each of these three filter beds will receive a dose about once in every five or six hours.

The grit wells and septic tank can be cleaned out by use of hose connected with the city water. The flushing will flow by gravity through the six-inch pipe to the sludge beds located near the bank of the river. The sludge will be washed on to this bed and the liquid be allowed to filter through it. The solid matter, after becoming dry, can be raked up and burned or otherwise disposed of. The septic tank is provided with an outfall which can be used during the cleaning out of the tank.

The electric motor and pump are designed to be started and stopped automatically. The electrical appliances for this purpose, consisting of a self-starter, float switch and float, are to be furnished by the city in connection with the motor and pump, outside of the regular construction contract. It is very important that great care should be used in selecting these appliances, in order to make sure of certainty of operation. No recommendation of any particular manufacturer's appliance is made, but the city authorities who will have in charge the purchase of the same should insist upon the manufacturer giving full details and specifications, with a guarantee as to quality and operation, before such purchase is finally decided upon.

The centrifugal pump, by means of which the sewage is pumped from the receiving well into the sewer in Hannibal street, will be regulated so that the amount of sewage pumped into the high level sewer will be as nearly uniform as possible.

Respectfully submitted,

W. S. FARRINGTON,

Engineer.

August 15, 1904.

FULTON SEWERAGE SYSTEM.

WEST SIDE.

	Gallons.		
Fourth st. from Oswego Falls road to Cedar st..	27,000		
Fourth st. from Cedar st. to Chestnut st.......	16,000	43,000	43,000
Cedar Street and Branches:			
First st. from Oswego Falls road to Walnut st..	22,000		
Wickham st. from Maple st. to Walnut st......	16,000		
Second st. from Maple st. to Chestnut st.........	24,000		
Third st. from Maple st. to Chestnut st.......	20,000		
Walnut st. from First st. to Fourth st.........	20,500		
Cedar st. from First st. to Fourth st..........	21,000	123,500	
Cedar street from Fourth st. to Fifth st........	4,700	4,700	171,200
Fifth st. from Cedar st. to Walnut st..........	8,000	8,000	179,200
Walnut st. from Fourth st. to Fifth st.........	4,700		
Fifth st. from Walnut st. to Chestnut st.......	8,000	12,700	191,900
Chestnut Street and Branches:			
First st. from Walnut st. to Pine st...........	24,000		
Second Street and Branches:			
From Chestnut st. to Broadway..............	56,300		
Third st. from Chestnut st. to Pine st..........	20,000		
Fourth Street and Branches:			
From Chestnut st. to Beech st................	34,800		
Chestnut st. from First st. to Fourth st........	20,800	155,900	
Chestnut st. from Fourth st. to Fifth st.......	4,700	160,600	
Chestnut st. from Fifth st. to Broadwell.......	3,000		355,500
Broadwell st. from Chestnut to Oak st.........	8,000		363,500
Broadwell st. from Oak st. to Pine st..........	8,000		371,500
Broadwell st. from Pine st. to Beech st........	8,000		379,500
Beech st. from W. R. R. to Third st..........	21,600		
Fifth Street and Branches:			
From Chestnut st. to Beech st................	24,000	45,600	
Fifth st. from Beech st. to Broadway..........	5,300		430,400
Broadway, west of R. R. to Third st..........	21,600		
Fourth st. from Beech st. to Broadway........	5,300	26,900	
Fifth st. from Broadway to Voorhees st.......	8,000	34,900	465,300
Voorhees st. from R. R. to Fourth st..........	10,800		
Fifth st. from Voorhees st. to Leitch st........	8,000	18,800	484,100
Leitch st. from R. R. to Fifth st..............	5,400		
Fifth st. from Kellogg st. to Leitch st.........	8,000	13,400	497,500
Kellogg st. from R. R. to Fourth st...........	10,800		
Fourth st. from Kellogg st. to Leitch st.......	8,000		
Fourth st. from Broadway to Leitch st........	16,000		
Leitch st. from Fourth st. to Third st.........	5,400	40,200	537,700
Voorhees st. from Fourth to Third st..........	5,400		
Third st. from Broadway to Leitch st..........	16,000	21,400	
Third st. from Leitch st. to Kellogg st.........	8,000	29,000	566,700

Fifth Street and Branches—Continued.	*Gallons.*		
Kellogg st. from Fourth st. to Third st........	5,400		
Third st. from Kellogg st. to Phillips st........	8,000	13,400	580,100
Phillips st. from Second st. to Fourth st.......	10,800		
Third st. from Phillips st. to Hart st...........	8,000	18,800	598,900
Hart Street, Above Third Street and Branches.	88,200		
Third st. from Hart north 1 block............	8,000		
Hart st. from Third st. to Second st..........	5,400	101,600	700,500
Second st. from Phillips to end...............	12,000		
Hart st. from Second st. to First st...........	8,000	20,000	720,500
First Street and Branches:			
From Pine st. to Hart st....................	144,600		
First st. from Hart st. to Schuyler st..........	8,000		873,100
Schuyler Street and Branches:...............	59,500		
First st. from Schuyler st. to Gansvoort.......	8,000		936,600
Gansevoort Street and Branches.............	71,000		
Worth Street and Branches.................	28,000		
Hannibal Street and Branches...............	29,900		
Hannibal st. Outlet creek district............	68,800		
Walrath Street and Branches	21,000		
First st. from north end to Gansvoort.........	44,000	262,700	
Schenck st. from First st. to Worth st.........	5,000		
Worth st. from First st. to Schenck st.........	10,000	15,000	277,700
Total through outlet			1,214,300

GARDEN CITY.

ORIGINAL SEWER PLANS.

Garden City is an unincorporated city situated in the town of Hempstead, Nassau county. It was laid out and is managed by a private corporation, the Garden City Company.

On May 6, 1904, the State Commissioner of Health approved an original set of plans for a system of separate sewers and disposal works, in accordance with the provisions of chapter 468 of the laws of 1903. The plans submitted for approval comprise:

A general sewer map, printed as Plate XXXI of this report.

A plan showing the location and general features of the sewage-disposal system, printed as Plate XXXII of this report.

A sheet of detailed plans of screen chamber, gatehouse, septic tank and dosing chamber, printed as Plate XXXIII of this report.

A plan of the operating house of sewage-disposal system, printed as Plate XXXIV of this report.

A sheet of standard sewer details; on file, but not printed in this report.

Sixteen sheets of sewer profiles; on file, but not printed in this report.

A descriptive report by the designing engineer, Mr. Charles W. Leavitt, Jr., hereto appended.

A set of printed sewer specifications, on file, but not printed in this report.

PRELIMINARY REPORT TO THE GARDEN CITY COMPANY ON SEWERS AND SEWAGE DISPOSAL.

NEW YORK, *January* 7, 1904.

In taking up the matter of sewerage for the property of the Garden City Company, the first thing that presents itself to one's mind is, that there is no proper outlet for the sewage close by, and that none of the surrounding towns have any sewers. It, therefore, seems a reasonable proposition that a trunk sewer from Garden City to tidewater might be constructed, serving at the same time the adjacent towns and villages, this being the natural outlet for the sewage and one that will probably be adopted in some manner at some time in the future.

In this connection I would point out that there are several advantages to be gained by having this trunk sewer built, either by the Garden City Company or an allied sewerage company, chief among which would be the starting of the sewer from the point on the company's property best adapted to act as an outlet; that is, the most central and the one requiring the least pumping of the sewage.

Of course, the trunk sewer to tidewater would be only advisable from the standpoint of the Garden City Company provided towns through which and near which it would run between Garden City and the Rockaway inlet, which is the nearest and most available point for discharging the sewage.

In this connection I would say that I have not fully investigated the question of the pollution of this watercourse, but as it

is 100 feet or more in width and some 10 feet deep, with a good current, I do not think that the amount of sewage which would be discharged therein under the separate system of sewers which I should propose could produce sufficient pollution to become a nuisance in any way.

The alternative necessitated is the disposal of the sewage of Garden City by some method of sewage disposal on the property. I have made a careful study of this subject for a number of years and have installed a number of disposal plants, and according to data available, both from own experience and that of the profession at large, I think it is universally conceded that where the conditions are favorable intermittent sand filtration of sewage preceded by the action of a septic tank is undoubtedly the best, and the conditions necessary to this method of disposal seem to be very good on your property.

The property belonging to the company is divided naturally into five sewerage areas or valleys running approximately north and south across the property and which would naturally collect all the drainage at the southerly boundary at five different points, three of which would control some eight or nine-tenths of the sewage, and one, the Cherry Valley district, would drain almost all the present town and provide for growth to the west for a mile or so.

Considering these different outlets in relation to the trunk outlet sewer proposed, I have made a rough investigation and find that the Cherry Valley outlet and the one from the foot of Hilton avenue would come nearly together several miles toward the outlet or at Rockville Center, but that one of them would still have to be pumped to properly reach the sewer outlet, and I find that the sewage from their natural outlets on the property would have to be pumped in any case to one or the other of these outlets, and I have decided from the data at hand that it will be better to collect the sewage at one point on the southerly boundary of the company's property before starting it toward the ocean, and that the most available outlet, provided the trunk sewer is to be built, is the one at the foot of Hilton avenue, from which a sewer can be built entirely on the highways and at a very fair grade for the greater part of the distance, through the center of Hempstead, along the easterly side of the Hempstead

reservoir, through Rockville Center and East Rockaway to a point on the east of the Rockaway inlet and near the railroad crossing. It would be necessary on this line, as on any other, unless expensive cuttings were made, to raise the sewage by pumps at two points, one of which would be near the head of the Hempstead reservoir, just south of the town of Hempstead, and the other at the point spoken of, near the railroad crossing in East Rockaway.

At the first of these stations the sewage would be raised some 15 or 20 feet up a small hill and allowed to again flow down to East Rockaway, where I expect it would have to be raised again, and I have proposed and estimated on building a reservoir and pumping from there direct into the inlet at high tide. A small piece of property and right of way would have to be bought at this point on which to locate the outlet station, this being the only private property required.

Another reason for using this line and collecting all the ultimate sewage on the property of the Garden City Company at one point is the fact that the other outlet line spoken of from Cherry Valley to Rockville Center runs through a very sparsely settled country, which would provide no revenue for a number of years at least, while the line which I would propose as above will serve East Rockaway, Rockville Center, Hempstead, Garden City and Mineola (by extending the Garden City sewers thereto) and the intermediate and outlying districts along the line.

In this connection I have made a rough preliminary estimate of the probable future population of this district for, say, 50 years. The amount of sewage which would result from such a population, the size of the pipe necessary and the cost of construction of the sewer is shown by the following table:

OUTFALL SEWER.

APPROXIMATE PRELIMINARY ESTIMATE.

SECTION.	Dist. ft.	Grade.	Est. fut. pop. trib. to sec.	Est. gals. sewer per day.	Size pipe.	Cost sect.
Garden City outlet to	3,000	.0025	25,000	2,500,000	20″	$6,000
Hempstead Center to	.....	.....	......	....	.....	....
Hempstead Reservoir	5,000	.0025	40,000	4,000,000	24″	11,250
To Rockville Center	13,000	.0025	50,000	5,000,000	24″	29,250
To East Rockaway	8,000	.0025	60,000	6,000,000	24″	18,000
	29,000					

Pumping plant at Hempstead Res.	Reservoir and house	$5,000	
	Pumps, etc	4,000	
			9,000
Pumping plant at outlet	Reservoir and house	$20,000	
	Pumps, forcemain, etc.	6,000	
			26,000
			$99,500

This estimate does not include the cost of any property or right of way purchased or franchise obtained or the engineering expenses, but I think it safe to say that the total cost of the outlet sewer from the Garden City boundary to the Rockaway inlet would be something less than $125,000. The pipe estimated on (24-inch) is sufficient to serve the total population mentioned (60,000) and more, at the grade specified, and at the same time I estimate that Garden City and Mineola or even Garden City alone would require an 18 or 20-inch pipe, and while the 24-inch pipe is not much greater in diameter it will carry a great deal more sewage and cost relatively a very little more and be better in every way. I mention this in connection with your probable thought as to the requirements for Garden City alone as to a trunk sewer, and I would say in this connection that I do not think that it will be an economical problem for Garden City alone to build an outlet sewer for a good many years to come, but that with the addition of the sewage from the towns through which the sewer passes I think the question becomes a very practical one. There are, of course, a number of questions to be considered in connection with this problem, such as the law governing the forming of such sewer companies and the franchise required; also further information as to the pollution which would be caused at Rockaway inlet and the need of the towns mentioned for sewage.

We now come to the alternative proposition; that is, if it is decided not to build the trunk sewer at present, it will be necessary to provide sewage disposal for the sewage of the present growing town, which should not be left without sewers much longer.

I have looked into this question carefully and would recommend the collecting of all the sewage from the company's property as the different sewers are built, either by gravity or by pumping at a point near the lower end of the Cherry Valley road, from which point I would pump the sewage on to the knoll which forms a point in the southerly boundary line of the property just west of the Cherry Valley road and which is, I think, the best adapted for sewage disposal of any portion of the property, that is, as to shape and location.

On this area I would lay out certain filter beds and build a screen chamber, septic tank and dosing chamber to treat and deliver the sewage to the beds. In this connection I have made some studies of plans for this point, in which I have embodied a number of improvements in the treatment of the sewage, from which I would expect very good results.

The difficulty with septic tanks is generally that they have to be built for a greater flow of sewage than will reach them for some time after construction, and it is not, therefore, possible to give the sewage the proper time for action in these tanks. I have perfected a design for a septic tank which does away with this objection, as by a system of different compartments I am able to allow the sewage to remain in the tank the proper time, which will be of great advantage in the purification of the sewage. I have prepared an approximate estimate of the cost of such disposal works, as follows:

SEWAGE-DISPOSAL WORKS—PRELIMINARY APPROXIMATE ESTIMATE.

Septic Tank, Dosing Chamber and Screen Chamber.

Excavation and backfilling............	$700 00	
Concrete	3,000 00	
Roof and houses over screen chamber and dosing chamber	1,000 00	
Siphons, starting device, valves and piping	1,500 00	
		$6,200 00

Beds.

Topsoil stripped and replaced..........	$900 00	
Excavation and backfilling.............	5,000 00	
Pipe, 15-inch gutters..................	385 00	
Pipe, 12-inch delivery.................	1,440 00	
Pipe, 10-inch, under drain.............	1,595 00	
Pipe, 4-inch, under drain..............	1,200 00	
Concrete	70 00	
		10,590 00
		$16,790 00

This plant would be automatic in its action, that is, by a system of siphons the dosing chamber would discharge in rotation on the different beds and the only care which the plant would require would be occasional inspection, the proper regulating as to the number of chambers in the tank which should be employed and occasional raking of the surface of the beds, etc.

In regard to the system to be employed in pumping the sewage, there are two which are properly available, one of which—the Schone system of sewage ejectors—is especially designed for such service. This consists of a special tank holding one or two hundred gallons of sewage which is discharged automatically by compressed air, and I should suggest in this case compressing the air at the water-pumping station and distributing it to the different sewer-pumping stations, that is, the Central or Cherry Valley station at present and the other stations in the future as required by the growing population. The other system would be the use of gasoline engines and pumps, each pumping plant being independent of the others and working semi-automatically, that is, they could be arranged to stop when the reservoir had been emptied, but would have to be started again when required.

In connection with the pumping plants I would call your attention to the fact that all with the exception of that at the foot of Hilton avenue would be entirely available provided it was decided at some future date to consider the trunk outlet sewer, and the ejectors or pumps from the Hilton avenue station could be used at one of the outlying stations not yet installed, so that the only expense which would be thrown away would be the actual cost of the disposal plant, some $17,000, for which amount you would have purified the sewage for a number of years.

I find that there are about 1,200 acres tributary to the central sewage-pumping station at the foot of Cherry Valley, that is the sewage from this district will reach there by gravity. This district includes all of the present buildings in the town with the exception of a small district where the tenements are located, and which provides as I have stated before for the growth to the west for a mile or more, thus it would seem that the other pumping plants need not be established for some time to come, with the exception of that at the foot of Hilton avenue, which would be a small one and could be installed at a small relative cost when thought necessary. I would suggest the immediate construction of some 35,000 lineal feet of sewers to serve the present buildings; the pipe ranging in size from twelve-inch to eight-inch, all constructed as a separate system of sewers, that is taking only the house wastes and excluding all surface drainage, leader water, etc., and equipped with manholes no further apart than 300 feet and with flush tanks at the ends of the different branches.

This system would cost approximately $1 per lineal foot of sewer laid complete, including manholes, flush tanks, etc.

Trusting that I have made myself clear in this preliminary report and hoping that you will criticise it as you think best, and advise me as to your conclusions in regard to the matter, I beg to remain,

Yours very respectfully,
CHARLES W. LEAVITT, JR.,
Civil Engineer,
New York City.

HOUSE OF REFUGE FOR WOMEN, HUDSON.

ORIGINAL PLANS FOR SEWAGE-DISPOSAL SYSTEM.

On February 10, 1904, the State Commissioner of Health approved a set of original plans for a sewage-disposal system for the State House of Refuge for Women in the city of Hudson, in accordance with the provisions of chapter 383 of the laws of 1903. The plans submitted for approval comprise:

A map of the grounds of the institution, showing the location of the disposal plant, printed as Plate XXXV of this report.

Two drawings of the sewage-disposal plant, printed as Plate XXXVI and Plate XXXVII of this report.

A profile of the sewer line to the disposal plant, showing the elevation of the several buildings of the institution; on file but not printed in this report.

A set of specifications, partly printed and partly typewritten, dated August 22, 1903, for the construction of the sewage-disposal plant; on file but not printed in this report.

LESTERSHIRE.

CHANGES OF SEWER LOCATION.

Original plans for a separate system of sewers and sewage-disposal works for the village of Lestershire, Broome county, were approved by the State Commissioner of Health on February 27, 1903, in accordance with the provisions of chapter 414 of the laws of 1897, and appear in the twenty-fourth annual report.

On October 4, 1904, the State Commissioner of Health approved plans for certain changes of sewer location in the vicinity of Willow street and the Delaware, Lackawanna and Western railroad, in accordance with the provisions of chapter 414 of the laws of 1897. The plans submitted for approval comprise:

A map showing the changes of sewer location to be made, printed as Plate XXXVIII of this report.

A sheet of sewer profiles for the streets affected by the changes; on file but not printed in this report.

MILLBROOK.

ORIGINAL SEWER PLANS.

Original plans for a system of sewers and sewage disposal for the village of Millbrook, Dutchess county, N. Y., were approved

by the State Commissioner of Health on December 31, 1904, in accordance with the provisions of chapter 414 of the laws of 1897. The plans submitted comprise:

A general contoured sewer map of the village, dated 1903, on a scale of 250 feet to the inch, printed as Plate XXXIX of this report.

A sheet containing drawings of the disposal works and also of manhole and flush tank details, printed as Plate XL of this report.

A drawing showing the location and elevations of the land proposed to be used for the subsoil irrigation, and showing the location and elevation of the pipe system as proposed, printed as Plate XLI of this report.

A sheet of sewer profiles; on file but not printed in this report.

A written description of the system by the designing engineer, hereto appended.

A set of specifications, notice to bidders and form for contract and bond; on file but not printed in this report.

DESCRIPTION.

Area of whole village, about 1.84 square miles.

Area of part covered by sewer plans, 200 acres.

The balance of the village cannot be brought into the proposed system, but must have separate treatment.

Population last United States census, 1,027.

Population previous United States census, 800.

Probable increase,

Population within sewer system area, 800.

Rainfall, 40 inches.

The basis of calculation and capacity of piping and disposal system is more than 60 gallons per capita per day.

Amount of sewage flow, 48,000 gallons per day.

A public water system is contemplated from which water can be secured for flushing the sewers.

The only place for discharge of sewage is into a small stream at the corporation line, which at certain hours of the day becomes nearly dry, in the summer season, by reason of shutting off the

water to fill the ponds that operate a grist mill located a short distance above the proposed disposal works. This mill is operated only by water power and when in operation the pond is drawn upon, thus increasing the natural flow of water of the creek. This would slump away any objectionable matter temporarily lodged in the channel at the disposal works. To avoid any unpleasant results from discharge of untreated sewage into the creek, a septic tank disposal works is proposed, the sewage from the tank to be discharged into large drain tile laid 18 inches below the surface of the ground. To provide for any temporary increase of sewage it is proposed to use a gravel filter similar to the one approved by the State Board of Health for Sharon Springs. This is shown as an overflow filter at the entrance of the septic tank. (This gravel filter is to be omitted.)

Capacity of septic tanks, 15,000 gallons.

Time of sewage in tank, from 5 to 10 hours.

The creek into which the sewage will flow is not used for a domestic supply of water.

NEW ROCHELLE.

ADDITIONS AND EXTENSIONS OF SEWERS.

Original plans for a system of sewers for New Rochelle, Westchester county, N. Y., were approved by the State Board of Health December 19, 1888, and appear in the ninth annual report of the Board.

Plans for a change of location of the outlet sewer were approved by the State Board of Health on January 29, 1898, and appear in the nineteenth annual report of the Board.

Plans for an extension of the storm-water drain on Main street were approved by the State Board of Health on February 23, 1899, and appear in the twentieth annual report of the Board.

Plans for an extension of the sewer system to Fourth street, Lockwood avenue, Madalaine avenue, Concord place, St. John's place and St. Luke's place were approved by the State Commissioner of Health on March 2, 1904, in accordance with the provisions of chapter 468 of the laws of 1903. These plans comprise:

A contoured sewer map of the above-mentioned streets and those adjacent thereto, printed as Plate XLII of this report.

A sheet of manhole and flush tank details; on file, but not printed in this report.

Six sheets of profiles of the sewers on the above streets; on file, but not printed in this report.

Plans for additions to the sewer system of New Rochelle were approved by the State Commissioner of Health on March 22, 1904, in accordance with the provisions of chapter 468 of the laws of 1903. These approved additions comprise two lists of sewers—(a) a number of sewers which had either been wholly constructed or which were undergoing construction, but which had not heretofore been approved; (b) a list of proposed sewers not yet constructed. Both these lists are shown and clearly distinguished in the following map. The plans for the above sewers comprise the following:

A general contoured sewer map for district No. 1 of New Rochelle, marked "Sheet No. 1," dated November, 1903, printed as Plate XLIII of this report.

A sheet of manhole and flush tank details; on file, but not printed in this report.

Fifty-four sheets of sewer profiles; on file, but not printed in this report.

On November 11, 1904, the State Commissioner of Health approved plans for a main or connecting sewer extending from East Main street across an arm of Echo bay to Hudson park, where it connects with the existing Hudson park outlet sewer. These plans comprise:

A map of the location of the sewer from East Main street to Hudson park, dated 1903, printed as Plate XLIV of this report.

A profile showing the sewer, including the cast-iron inverted siphon extending under the arm of the bay, printed as Plate XLV of this report.

A plan of the sand catcher, diverting manhole, emergency outlet and drop well of the inverted siphon, printed as Plate XLVI of this report.

A map of New Rochelle, showing the sewer system as built and completed to December 31, 1904, on which is shown the general location of the connecting sewer from Main street to Hudson park; on file, but not printed in this report.

OWEGO.

Intercepting Sewers and Sewage-Disposal Works.

Plans for intercepting sewers and for sewage-disposal works for the village of Owego, Tioga county, N. Y., were approved by the State Commissioner of Health on August 16, 1904, in accordance with the provisions of chapter 468 of the laws of 1903, subject to the condition that the construction of the disposal works may be deferred until such time as, in the judgment of the State Commissioner of Health, the demands of public health require its construction. The plans submitted comprise:

A general map of the village of Owego, showing the present sewer outlets, the proposed intercepting sewers and the location of the proposed sewage-disposal plant, printed as Plate XLVII of this report.

A sheet of profiles of the proposed intercepting sewer, printed as Plate XLVIII of this report.

A sheet of plans of the proposed sewage-disposal system, printed as Plate XLIX of this report.

SENECA FALLS.

Original Plans for Sewers and Sewage Disposal.

Plans for an original system of sewers and sewage disposal for the village of Seneca Falls, Seneca county, N. Y., were approved by the State Commissioner of Health on March 2, 1904, in accordance with the provisions of chapter 414 of the Laws of 1897. These plans comprise:

A general contoured sewer map of the village, printed as Plate L of this report.

A sheet of details of manholes, flush tank and lamphole; on file, but not printed in this report.

Six sheets of sewer profiles; on file, but not printed in this report.

A sheet of drawings of the sewage-disposal septic tank, printed as Plate LI of this report.

A sheet of drawings of the building over the septic tank gatehouse and of the sludge beds, printed as Plate LII of this report.

A report by the designing engineers, Messrs. Farrington & Duffies, dated December 24, 1903, hereto appended.

A set of specifications and form of contract and bond; on file, but not printed in this report.

SYRACUSE, N. Y., *December* 24, 1903.

To the Municipal Board, Seneca Falls, N. Y.:

GENTLEMEN:—In accordance with your instructions we have made the necessary surveys and have prepared plans and specifications for a complete system of sewerage for the village of Seneca Falls and which I present herewith.

The plans consist of a general map of the village, on a scale of 300 feet to the inch, profiles of all the streets, a sheet of details showing manholes, flush tanks and lampholes, together with a plan of disposal showing detail of septic tank and its appurtenances. The general map shows all the streets of the village with five-foot contour lines, all sewers, with their sizes, direction of flow, rate of grade and the location of manholes, lampholes and flush tanks. The elevation of the sewer invert is shown at intersections and other important points.

The profiles show all the streets in the village that have been opened, with the ground line, depth and size of the sewer, the direction of flow, rate of grade and the position of manholes, lampholes and flush tanks.

The specifications, together with the form of notice to contractors, proposal and contract, give the requirements and method of construction of the system as planned. The accompanying quantity sheet and estimate gives the estimated quantities and cost of work and material required for the construction of sewers in all the streets where there are any houses, including disposal plant, in accordance with the specifications.

The elevations are referred to the B. M. described as the southeast corner of the top of the water table of the Johnson Hall building, elevation 106.93.

The accompanying report gives the description of the system and the reasons for the design.

Respectfully submitted,

FARRINGTON & DUFFIES,

Civil Engineers.

REPORT ON THE PROPOSED SYSTEM OF SEWERS FOR SENECA FALLS, N. Y.

The village of Seneca Falls, N. Y., is an incorporated village, having an area of about two and three-quarter square miles. The population was given as 6,116 in 1890 and as 6,519 in 1900.

The Seneca river and canal divide the village into two sections of about equal areas. Along the Seneca river and the Seneca canal through the village the banks are steep and to quite an extent consist of vertical walls, which are the supporting walls of buildings used for manufacturing purposes, utilizing the extensive water power of this river.

The village has a system of waterworks owned and operated by the Seneca Falls Water Company. The supply is obtained from Cayuga lake and pumped into a standpipe in the village. The water is in general use throughout the village, about 600,000 gallons daily being pumped on an average for all purposes.

There are no pavements. There is but one street railway. This single-track line extends through Fall street from the west village line to Ovid street; through Ovid street to East Bayard street; through East Bayard street to Stephenson street, and through Stephenson street to Easton road at the south village line.

The business portion of the village is located on Fall street, from Mynderse street to Ovid street; State street, near Fall street; Cayuga street, near Fall street; Ovid street, from Fall street to Bayard street; Bayard street, from Bridge street to Spring street; Bridge street, from William street to Bayard street.

The existing sewers, which, with some adjustments in grades at intersections and by the addition of manholes and flush tanks, that can be used and which have been incorporated into the new system, are as follows:

Mynderse street, Porter street to Fall street; Daniels street, Troy street to Mynderse street; Johnson street, Cayuga street near New York Central railroad; Maple street, Pine street to Johnson street; Porter street, west of Mynderse street; Elm street, White street to the river; Green street, Montgomery street to White street; Bridge street, Haight street to West Branch.

The existing sewer in Porter street between Mynderse and State street is unsatisfactory and its use is not contemplated. This is also true of the sewer in Cayuga street, between Johnson street and Auburn street.

The Elm street sewer has been designated as the "Elm street outlet." This sewer was built in 1900. From the corner of Elm and Goodwin street it is of 18-inch tile and is built over private right of way to the river approximately as shown on the map. Its location and grades are not definitely defined, but are substantially as shown.

The Mynderse sewer discharges at present into the river opposite the foot of Mynderse street. The part south of Fall street is to be abandoned when the new Fall street sewer is constructed. The present Johnson street sewer passes under the New York Central railroad embankment and reaches the river through a small ditch emptying below Lawrence street.

The proposed system provides that all the sewage from the north side, with the exception of what has been called the "Lawrence street district," be brought to the corner of Fall street and Ovid street by the various sewer lines as shown on the plan presented. From this corner the sewer passes south through Ovid street, crossing over the mill race, the river and the Seneca canal by an iron pipe suspended from the bridge trusses, and discharges into a drop manhole at the corner of Canal street and Ovid street. To this point is also brought the sewage from the territory drained by the Bayard street, Bridge street and Ovid street sewers and their branches.

It will be noticed upon referring to the map that the topography of the south side of the village is more broken. It has been found necessary, in order to drain this territory and bring the sewers to a common outlet, to locate a sewer line through each of the two "gullies" which have been designated as the East branch and the West branch.

The sewers from these two branches come together south of Bayard street and from their junction pass under the embankment of Bayard street through the stone arch already constructed, and is brought to the intersection of the towpath and Ovid street.

At this point all the sewage for the north side, except that from the "Lawrence street district," and all the sewage for

the south side, except that designed to be carried by the Elm street outlet, is concentrated. From here the outlet sewer passing along the south side of the towpath and along the foot of the high bank conveys the sewage to the proposed septic tank located as indicated on the plans and to which point the Elm street outlet is already constructed.

The Lawrence street district includes Lawrence street, Dey street to Seneca river; Fall street, from near Ovid street to Dey street; Wall street, Dey street to Seneca river; Dey street, New York Central railroad to Fall street; Trinity lane, Cayuga street to Fall street.

This district has a population at present of about 300 people and it is not probable that this population will increase to any extent.

This territory is too low to be brought into the outlet sewer. The plan presented contemplates the discharge of the sewage from this district direct into the river at the foot of Lawrence street until such time as, in the opinion of the State Department of Health, such discharge should be objectionable.

At that time a receiving well is to be constructed near the foot of Lawrence street to receive the sewage for this district. In this well is to be placed a vertical centrifugal pump operated by an electric motor, which will pump the sewage from the well through an iron force main to the sewer at the foot of Prospect street, as indicated on the plans, and this sewer leading to Cayuga street has been designed with this in view.

To make the sewers in Lawrence and Wall streets effective, the present street grades will have to be raised, as extreme high water reaches the present grade of these streets. The elevation of ordinary water level in the river at this point is about 39.5 and high water 41.0. The present houses in this flat district are built either without or with very shallow cellars.

Sewers are shown for all streets in the village that are opened or likely to be opened in the near future. Streets that have been mapped on proposed tract maps, but not likely to be opened for some time, are shown on the map by broken lines and allowance has been made for taking care of this possible additional territory.

With the exception of four or five houses on Miller street and Fall street west of Walnut street, two houses on Rumsey street

south of Fall street, and a few buildings at Walnut and Water streets, having a possible population of not to exceed 50, the system proposed will serve all the dwellings at present built.

This Water street section at present drains directly into the river. When the proposed Fall street sewer is constructed the buildings on the north side of Water street, between Bridge and Fall streets, can be served and also those near Fall street on the south side of Water street.

The grade of Water street, Bridge and Walnut streets can not be raised, and as it is below the Fall street sewer it will be necessary when, in the opinion of the State Department of Health, such action is required to collect this sewage in a small well near the corner of Water and Walnut streets and pump it up with the Fall street sewer.

West Bayard street to the west of Van Rensselaer street is merely a country highway. This is also true of Black Brook road and Clinton street north of Porter street.

The plan proposed contemplates the construction of a septic tank, as indicated on the plans, at the junction of the south side outlet with the Elm street outlet. The present Elm street sewer is located in the bottom of a gully, which widens out near the river so as to afford sufficient room for septic tank and appurtenances. It is proposed to secure control of all this flat land so as to have this entire space available for future use.

Sewage is received into the septic tank at elevation 44.0. The ordinary water level of the river at this point is 33.5 and high water 35.0.

The septic tank is shown in detail on the plan. The sewage is received into a grit chamber, from which it flows over a weir and passes into the septic tank proper, the current being diverted toward the central level of the tank by baffle boards placed near the weir as shown. The sewage passes slowly through to the tank and at the entrance to the effluent chamber is diverted upward by baffle boards and discharges into the effluent chamber and thence through the 24-inch outlet pipe into the river. The septic tank is designed to hold 180,000 gallons, and when greater capacity is desired it is proposed to add another tank of like capacity and design and the pipes, valves and fixtures are placed with that in view. A four-inch vertical centrifugal pump driven

by an electric motor is provided for pumping the sludge from the tank when such removal is necessary. The sludge pit (43x100) is proposed to be constructed on the river bank to receive this sludge. The bottom is graded toward the stream and the side of the pit next to the river is constructed of stone and gravel so as to afford drainage for the liquid part of sludge which is drained off, and the solid matter is left to dry and is then raked up in piles and burned or disposed of as fertilizer.

For the present the plan contemplates discharging the effluent from the septic tank directly into the river, and when, in the opinion of the State Department of Health, a higher degree of purification is necessary, contact filter beds or such other system as the department at that time may deem advisable could be constructed in connection with the present plan.

Seneca river has a large watershed, being the outlet of Seneca and Cayuga lakes, and the flow of water at all times of the year is large. In 1899 the minimum flow of this river at Baldwinsville, located about 35 miles below Seneca Falls, was 177 cubic feet per second, and in September, 1900, 919 cubic feet per second.

The system is designed to care for the house sewage only. The surface water can be more directly and economically removed through the natural watercourses.

In designing the size of the sewers it has been assumed that sewage would be discharged at the rate of 100 gallons per day per capita. Allowing 5 persons for each 50-foot lot, or 10 persons for each 50 feet of sewer, results in 20 gallons per day per lineal foot of sewer. The sewers are designed to carry when running half full the entire flow of 24 hours in 16 hours.

Considerable six-inch pipe is contemplated for branches where the amount of sewage is small and where grades are steep. The minimum grade of all sewers is sufficient to produce two feet velocity per second, computed by Kutter's formula and using a coefficient of roughness equal to .013.

Special provision is made for flushing. Automatic flush tanks, having a capacity of 400 gallons, are provided at the beginning of each sewer. Manholes are placed at each intersection, at each angle, and at each change of grade. Lampholes are provided between manholes as indicated.

The elevation of the invert of the sewer is given for each sewer, both at entering and leaving the manholes.

Where Ovid street sewer crosses the Seneca river it is proposed to reduce from 20-inch to 12-inch at the manhole on the upper side of the bridge so as to use a 12-inch cast-iron pipe that is supported from the bridge. This iron pipe is placed at a grade of 1.50 per cent. and is designed to run nearly full.

Roof water will be admitted under the control of the Board while the system is new.

Consideration was also given to a plan for carrying the north side sewage across under the Seneca river by the way of Lawrence street or Wall street by means of an inverted siphon, but it was found that by taking the sewer across the Ovid street bridge, as the plan herewith presented contemplates, that the same result was accomplished at less cost and yet not increase the area of the low district not served.

Respectfully submitted,

FARRINGTON & DUFFIES,

Civil Engineers.

SYRACUSE, N. Y., *December* 24, 1903.

SENECA FALLS SEWER SYSTEM.

TABULATED STATEMENT OF QUANTITY OF SEWAGE FOR EACH SEWER AND BRANCH IN GALLONS PER 24 HOURS.

Fall Street Sewer.	*Gallons.*	
Fall street west of Black Brook road......	27,560	
Black Brook road........................	54,600	
Chapel street—Rumsey to Black Brook road	19,000	
Possible from territory west..............	300,000	
Fall street—Black Brook road to Rumsey.	19,220	
Lincoln street branch....................	8,000	
Heath street branch.....................	9,000	
		437,380
Rumsey Street.		
Ridge street branch.....................	22,000	
Rumsey—Ridge to Pleasant..............	5,880	
Pleasant street branch...................	20,580	
Rumsey—Pleasant to Chapel.............	5,840	
Chapel street branch....................	22,600	
Rumsey—Chapel to Chestnut............	6,140	
Chestnut street branch..................	22,000	
Rumsey—Chestnut to Oak...............	6,860	

Rumsey Street—Continued.	*Gallons.*		
Oak and Walnut branches	56,080		
Rumsey—Oak to Fall	12,000		
		179,980	
Fall street—Rumsey to Walnut	24,100		
Miller street branch	22,600		
Walnut street branch	6,220		
Fall street—Walnut to Clinton	7,580		
		60,500	
Clinton Street.			
Clinton—Chapel to Miller	19,260		
Miller street branch	12,080		
Clinton—Miller to Fall	6,240		
		37,580	
Fall street—Clinton to Mynderse		5,520	
			720,960
Mynderse Street.			
Tyre street branch	17,000		
Mynderse—Tyre to Buffalo	5,940		
Buffalo street branch	17,000		
Mynderse—Buffalo to Butler	5,940		
Butler street branch	17,000		
Mynderse—Butler to Boston	7,120		
Boston street branch	17,020		
Mynderse—Boston to Porter	5,900		
Porter street—east branch	16,580		
Porter street—west branch	18,060		
Mynderse—Porter to Van Cleef	6,240		
W. Van Cleef street and Clinton branches	59,620		
Van Cleef street—east branch	14,340		
Mynderse—Van Cleef to Daniel	6,640		
Daniel street—west branch	5,400		
Daniel street—east branch	11,300		
Mynderse—Daniel to Chapel	16,280		
Chapel street branch	18,780		
Mynderse—Chapel to Jefferson	4,260		
Jefferson street branch	7,200		
Mynderse—Jefferson to Fall	20,140		
		297,760	
Fall street—Mynderse to State street		4,340	
			302,100
			1,023,060
State Street.			
Troy street—Village line to Tyre	24,760		
Tyre avenue branch	22,000		
Buffalo street branch	15,000		
Troy—Tyre to Butler	9,620		
Butler street branch	11,000		
Troy—Butler to Boston	7,520		
Boston avenue branch	8,640		
Troy—Boston to Porter	5,120		

State Street—Continued.	*Gallons.*		
Troy—Daniels to Porter	13,660		
Porter—Troy to State	7,620		
		124,940	
State—Tyre to Porter	25,900		
State—Porter to John	26,240		
John Street branch	5,440		
State—John to Chapel	10,340		
Chapel street branch	35,320		
State street—Chapel to Fall	22,420		
		125,660	
Fall street—State to Cayuga		12,060	
			262,660
			1,285,720
Cayuga Street.			
Cayuga—Village line to Pine	50,680		
Auburn street branch	30,000		
Cayuga—Pine to Dey	30,000		
Cayuga—Dey to Fall	43,500		
Pine street branch	17,860		
Maple street branch	9,700		
Johnston street branch	23,760		
Prospect street branch	8,000		
		59,320	
Fall street—Cayuga to Ovid		3,600	
			217,100
Total at Ovid street bridge			1,502,820
Lawrence Street District.			
Fall—Ovid to Trinity	4,080		
Trinity branch	9,340		
Fall—Trinity to Dey	14,340		
Dey—Fall to Wall	1,700		
Wall street branch	8,000		
Dey—Wall to Lawrence	5,180		
Dey—Railroad to Lawrence	8,600		
Lawrence—Dey to River	17,840		
		69,080	
Total at Ovid street bridge		1,502,820	
Total gallons from North Side			1,571,900
SOUTH SIDE.			
Bridge Street.	*Gallons.*		
Bridge—Village Line to Shannock	25,560		
Shannock avenue branch	30,000		
Bridge—Shannock to Mechanic	7,680		
Mechanic street branch	28,440		
Bridge—Mechanic to Haight	19,120		
Haight and Seneca Lane branches	23,800		
Bridge—Haight to William	12,840		
William street branch	14,800		
Bridge—William to Bayard	6,480		
		168,720	

		Gallons.	
West Bayard Street.			
West Bayard—Van Rensselaer to Bridge............		40,000	
West Bayard—Bridge to Ovid......................		22,280	
			231,000
Ovid Street.			
Ovid—Village line to South..............	28,000		
South street branch......................	8,800		
Ovid—South to Mechanic.................	6,640		
Mechanic street branch..................	10,400		
Ovid—Mechanic to Maynard.............	8,140		
Maynard street branch..................	12,000		
Ovid—Maynard to Chapin................	5,480		
Chapin street branch.....................	6,000		
Ovid—Chapin to Barker..................	1,940		
Barker street branch.....................	13,400		
Ovid—Barker to Gould..................	16,700		
Gould's Lane branch.....................	6,000		
Ovid—Gould's Lane to Green............	4,100		
Green street branch......................	35,300		
Ovid—Green to Bayard..................	5,500		
		168,400	
East Bayard Street.			
East Bayard—Washington to Spring.......	22,820		
Spring street branch.....................	7,400		
East Bayard—Spring to Ovid.............	11,460		
		41,680	
Ovid Street.			
Bayard to Canal................................		2,500	
			212,580
			443,580
Canal Street.			
Bridge street branch.....................	4,500		
Canal—Bridge to Ovid...................	24,120		
		28,620	
West Branch Sewer.			
Sackett street branches..................	31,600		
Toledo street branches..................	33,200		
Swaby branches.........................	16,820		
Center street branches..................	22,000		
		132,240	
East Branch Sewer.			
South street branch.....................	6,200		
Hoag street branch......................	18,940		
Boardman street branch..................	10,880		
Chapin street branches..................	24,120		
Spring street branch.....................	8,000		
Garden street branch.....................	11,600		
		79,740	
			211,980
Total gallons at Towpath and Ovid.......................			655,560

	Gallons.		
Latham Street Sewer.			
Mumford street branch	13,200		
Latham—Washington to Outlet	12,400		
		25,600	
Troup Street Sewer.			
Troup—Washington to Outlet	13,000		
		13,000	
Seneca Street Sewer.			
Washington street branch	26,400		
Seneca—Summit to Outlet	13,000		
		39,400	
			78,000
Total gallons below Seneca street			78,000
Elm Street Sewer.			
Meadow street branch	11,440		
Garden street branch	15,600		
White street branch	20,480		
Green street branch	46,000		
		93,520	
Elm street—White to Goodwin	12,200		
Goodwin street branch	7,600		
Elm—Goodwin to Bayard	40,000		
East Bayard street branch	36,000		
Stephenson street branch	87,340		
Seneca street branch, east	12,000		
Adam and Jay street branches	28,660		
		223,800	
Total gallons for Elm street sewer			317,320
Total gallons from North Side			1,571,900
Total gallons from South Side at Towpath and Ovid			655,560
Total gallons for outlet below Ovid			2,227,460
Total gallons below Seneca street			78,000
Total gallons for outlet on towpath			2,305,460
Total gallons Elm street outlet			317,320
Total			2,622,780

CRAIG COLONY FOR EPILEPTICS, SONYEA.

EXTENSION OF SEWAGE-DISPOSAL SYSTEM.

On January 20, 1904, the State Commissioner of Health approved a plan for an additional filter bed of the sewage-disposal system at the State Craig Colony for Epileptics at Sonyea, Liv-

ingston county, N. Y., in accordance with the provisions of chapter 383 of the laws of 1903. The plans submitted comprise:

A sheet of drawings of the proposed filter bed, printed as Plate LIII of this report.

A set of printed general specifications and of typewritten special specifications for the proposed filter bed; on file, but not printed in this report.

WEST SENECA.

ORIGINAL PLANS FOR SEWERS AND SEWAGE-DISPOSAL WORKS.

On December 31, 1904, the State Commissioner of Health approved original plans for a system of sewers and sewage disposal for sewer district No. 1 in the town of West Seneca, Erie county, N. Y., in accordance with the provisions of chapter 816 of the laws of 1895, and of chapter 468 of the laws of 1903. The plans submitted comprise:

A map showing the boundaries of the several sewer districts of the township, printed as Plate LIV of this report.

A general contoured sewer map of district No. 1, printed as Plate LV of this report.

A drawing showing the pumphouse and well of the sewage-disposal works, printed as Plate LVI of this report.

A drawing showing the general location of the sewage-disposal works, printed as Plate LVII of this report.

A drawing giving the general plan of the septic tank and contact beds of the sewage-disposal works, printed as Plate LVIII of this report.

A drawing showing the details of septic tank and of distributing chamber roof of the sewage-disposal works, printed as Plate LIX of this report.

A drawing showing details of distributing chamber of sewage-disposal works, printed as Plate LX of this report.

Eleven sheets of sewer profiles; on file, but not printed in this report.

Two reports by the designing engineer, Mr. Dennison Fairchild, one dated July 27, 1904, and the other December 29, 1904, hereto appended.

Specifications for the sewer system and for the sewage-disposal plant, on file, but not printed in this report.

Special specifications for boiler plant, for sewage pump and plant, and for the erections of a pumphouse and pump well; on file, but not printed in this report.

BUFFALO, N. Y., *July* 27, 1904.

To the Honorable Board of Trustees of the Town of West Seneca, N. Y.:

GENTLEMEN:—In accordance with your instructions, I have made surveys and plans for a system of sewers covering most of what is known as the "lighting district" in your town.

I present herewith a map of the sewerage district, which is known as "sewerage district No. 1," on a scale of 200 feet to the inch, with contour lines for every five (5) feet in elevation.

Upon this map the sewers which are proposed are designated by full lines; those which are now built are designated by dotted lines. I have also shown the sizes of pipes, rate of grade, direction of flow, location of manholes, flush tanks, lampholes, etc. The elevation of sewer grade is marked at intersections and important points.

I also hand you profiles of all of the streets on which sewers are located.

The sewerage district in question covers the territory bounded on the north by line from 100 feet to 400 feet north of the Ridge road; on the east it is bounded by a line about 1,000 feet east of South Park avenue; on the south by the south line of the town of West Seneca, and on the west by a line west of the Hamburg turnpike through the Lackawanna Steel Company's property.

In addition to this territory it is proposed to extend the sewer in the Ridge road to the Buffalo, Rochester and Pittsburg railroad, and owing to the very low elevation in the southeast corner of the district it is not practicable to sewer south of a point about 600 feet north of the south town line in South Park avenue. To cover this corner would require deepening all of the mains leading north and across Smokes creek, which, on account of

low, wet lands, would make a considerable increase in the cost of the system. The land in the southwest corner of the town is also very low, and for the same reason it is impracticable to sewer this territory for a distance of 1,200 to 1,500 feet north of the south town line from the Hamburg turnpike to the railroads.

The map shows all of the streets in the district which are laid out and along which houses are built. Sewers are not shown in Martin avenue, Electric avenue north of Kirby avenue and in Olcott, Odell and Boston place, for the reason that these streets are not at present built up and there is no necessity for sewers in them. The mains are laid out, however, in such a way that all of these streets, as well as all of the territory in the district with the exception of the southeast corner and southwest corner, can readily be sewered.

The district lying north of the Ridge road and west of the railroads naturally finds an outlet toward the northwest corner of the town. At present the village of the Lackawanna Steel Company, which now has a complete sewerage system and disposal plant of its own, finds an outlet in the main through the steel company's property to the lake.

At present there is no demand for a system of sewers in the balance of this district, but in the future it is proposed to connect this district up with the Lackawanna Steel Company's disposal plant and let the outfall be taken care of through their mains or through larger ones along the lines of the same.

The territory east of the railroads and north of the Ridge road is now owned by the city of Buffalo and is what is known as the South park. No sanitary system is necessary here and the drainage here will necessarily have to be taken care of by the city of Buffalo. East of South Park avenue and north of the Ridge road the surface slopes toward the city of Buffalo, and the most practicable scheme for handling the sewage from this district is through the mains of the city of Buffalo, and the application is now being made to the city for this privilege.

I also hand you detail plans of all the constructions connected with the sewers, manholes, catch basins, etc.

As shown on the plans it is proposed to carry all of the sewage to the low land in the vicinity of Holbrook avenue, and from this point pump it to the proposed disposal plant, a site for which

has not been practically agreed upon, but which can be located anywhere on the high land east of Ingham avenue or along the south bank of Smokes creek.

I am now preparing the plans for the pumping station as well as disposal plant, which will consist of a septic tank and primary filter of coke beds, and will hand you these in a very short time, so that they can be promptly approved by the State Board of Health.

I have based my figures on a population of 55 to the acre west of the railroads and a population of 40 to the acre east of the railroads, and have assumed an average of 100 gallons per capita per day. The present population of the district is about 9,500. The ultimate population, on the basis above stated, will be about 50,000. This system is to provide for house sewage only. On account of the necessity of pumping and purification this system was decided as being the most practicable. A separate system for drainage will ultimately be necessary. but the sanitary condition of the district, in my opinion, demands that the construction of the sanitary system as planned be started at the earliest practicable date.

Yours very truly,

DENNISON FAIRCHILD.

BUFFALO, N. Y., *December* 29, 1904.

To the Honorable Town Board and Board of Highway Commissioners of the Town of West Seneca, N. Y.:

GENTLEMEN:—Under separate cover I hand you herewith the following tracings and one blue print of each, constituting plans for disposal of sewage of West Seneca, N. Y.

(1) Plan for pump well and pumping station.

(2) A general plan, showing size and arrangement of inlet force main, septic tanks, distributing chamber, filter beds and outlet line.

(3) A full detail sheet, showing the masonry and iron work of the distributing chamber.

(4) A sheet containing details of roof of the distributing chamber and of one of the four septic tanks.

(5) A general plan, showing location of disposal plant on land to be purchased.

The drawings are probably self-explanatory from the structural standpoint, but a brief review of the functions of the several parts is necessary.

The plant is designed, not as all sufficient to serve the community indefinitely, but as a first unit in a system of multiples, to be built as the growth of the town demands. The nominal capacity of the present unit is *1,800,000 gallons per day,* which represents the estimated flow at the end of five years, based upon an increase (compounded) of 10 per cent. per year. When the volume of sewage equals the capacity of the present unit, another unit similar in design, but probably smaller, must be added.

The system recommended consists of septic-tank treatment for the elimination of the solids and the destruction of such as are organic, followed by single filtration through "contact beds." In view of the fact that the effluent will discharge into a stream which is of no use whatever, which is already badly polluted, and which, after a very short run through friendly manufacturing property, finds an outlet in the lake, it is evident that double filtration is unnecessary.

The entire disposal plant is included in a great circle 302 feet in diameter. (See general plan.) The actual area covered by it is 1.64 acres, but to accommodate it (and a driveway around it) about two and one-half acres will be needed. If the plan receives skilful attention it will develop an actual capacity about 20 per cent. greater than its nominal capacity. Two units, therefore, *carefully operated,* will treat practically 4,500,000 gallons a day—the estimated maximum flow which the area will contribute when fully occupied. I advise, therefore, the purchase of the land as shown on the detail plan which I hand you herewith.

The sewage delivered to the disposal works by the pumping station through the 20-inch force main (which will be laid with a constant rising grade, so that it may drain to the pump well when pumping ceases) passes first through the septic tanks. There are four of these, occupying the outer end of a sector whose included angle is about 66 degrees. (See general plan.) Each has a storage space 54 feet long, 12 feet deep and with a mean width of 32 feet. The combined capacity of the tanks is *622,000 gallons,* or slightly more than eight hours' average flow on a basis of *1,800,000 gallons per day.* The average rate of flow

through the tanks, when running at their nominal normal rate, is *1.35 inches per minute.* At the *outlet end* the *velocity* decreases to practically *one inch per minute.*

The force main delivers to the septic tanks, not at the edge of the great circle, but at the smaller and inner end, where it divides to the right and left, each branch rising to an outlet in the floor of an inlet or feed channel connected with two of the tanks. The bottom of this feed channel is perforated by 14 openings, each controlled by a cast-iron tompion plug, with heavy rubber washer, seating on a brass floorplate built into the concrete and tied to it with embedded bolts, as shown. Twelve of these openings are tank feeds and two are by-passes. The latter simply pierce the floor of the feed channel and afford direct communication with the drainage tunnel beneath. They are for use only in cases of emergency.

While the sewerage system is young and house connections are few, one or two of the four tanks will probably suffice for the treatment of the sewage. The others may then be shut off, but it is important that they be filled with clean water, so that pressures may be balanced and the walls of the tanks not subjected to unnecessary strain. The sewage is delivered to the tank some distance below the water level, but well above the bottom (see elevations), so that neither the scum nor the sludge will be disturbed by the incoming stream. The velocity is immediately checked and the liquid diffused through the cross-section of the tank by deflector plates which mask each inlet. The heavier solids soon sink to the bottom and the lighter ones rise to the surface. As the flow progresses toward the wider outlet end of the tank the velocity decreases and gradually the finer particles—even those of specific gravity approximating that of water—separate, settling or rising, until by the time the outlet is reached the liquid is free from nearly all its burden of suspended matter.

One foot from the outlet end a light apron wall, supported on "I" beams and tied to the heavier end wall, holds back the supernatant scum, allowing the liquid to escape under it and behind it from the whole width of the tank, on the plane of greatest clarity. Rising behind this wall the sewage pours over a long weir wall into the outlet channel, which runs over the force main

between the central pair of septic tanks, and thence to the distributing chamber in the center of the filters.

The solids retained in the septic tank remain until liquefied by bacterial action. As fast as dissolved they pass out with the escaping liquid. During the first few weeks of use the solids will accumulate at a rate which will apparently result in the speedy filling of the tank with sludge, but soon the process of decay will catch up with the increment and thenceforth the accretion will be almost imperceptible. Sooner or later the tank will need cleaning out, for some inorganic matter is sure to enter with the sewage—even if it be only the dirt washed from potatoes in the kitchen sink—and inorganic earthy matter can not be destroyed by bacterial agents. Moreover the decay of even the organic matter results in the deposit of a very slight peaty residue, which is irreducible. These substances remain as mechanical obstructions and sooner or later they must be removed mechanically, but the rate of accumulation is exceedingly slow (if the sewers be well laid) and the process of cleaning is exceedingly simple. It is only necessary to open a manhole, insert a suction hose connected with a hand pump and move the intake end around over the floor until the bulk of deposit has been removed. The tank need not be emptied or thrown out of commission during the process. The sludge may be applied as a fertilizer or simply plowed into a convenient tract of ground.

For use in special cases of emergency sluice valves are provided (one for each tank), discharging into the drainage tunnel which runs under the inlet or feed channel. These permit the withdrawal of the water lying above the sludge, but not of the sludge itself. The latter must not be allowed to enter the channel or drains.

The entire tank (save the inlet channel) is covered with seven inches of Portland cement cinder concrete, supported by the walls and piers, which are keyed into the mass one inch and reinforced by welded fabric 3x8 mesh Nos. 3 and 10 wire, bedded solidly in the mass six inches from the surface in the center of the bays and rising to within one inch of the surface over the walls and piers. Manholes, located as shown, afford access to various parts of the tank and outlet channel, and galvanized-iron

ladder steps built into the masonry lead to the bottom. The inlet channel is covered with a continuous series of wooden doors, so that any part may be opened for inspection, for cleaning or for manipulation of the valves.

Leaving the septic tank the clarified liquid passes to the distributing chamber. The channel through which it flows is shown as open, save that in section E-F there is indicated a wooden cover. Under ordinary atmospheric conditions the free access of air and light at this stage of treatment is a distinct advantage, but in bitter winter weather it will be well to cover this channel with plank so that the heat of the sewage may be conserved.

The plan of the distributing chamber is so crowded with detail that it seems exceedingly complex. As a matter of fact it is extremely simple. In construction great care must be taken to make the several chambers water tight and to insure the setting of the several parts at their exact respective elevations. If this be done, the distribution will take place with great regularity and without further care, for the system has no moving parts and little or no opportunity to get out of order.

The distributing chamber is composed of six units, exactly alike in equipment and function, and each serving its own filter bed. Each unit contains eight essential parts. The principle which dominates the entire system is that water flowing freely by gravity through a pipe shaped thus ∩ (a siphon) may be stopped by introducing into the crown of the pipe enough air to form an air-bind, and that the channel may be "unlocked" at will simply by allowing the confined air to escape. The rise and fall of the sewage in the several beds, as they fill and empty, furnish the motive power for the transfer and release of this air. Nothing moves save the air, so that there are no joints to lubricate, nothing to stick, nothing to wear.

The sewage, delivered into the circular feed channel P, overflows through an air lock A, which is freely vented at the crown by the pipe connecting with the open W-trap E. The flow speedily fills the chamber containing the bells B (in spite of the leaking of the small differential drain pipe G). As it rises it transfers the air contained in B into the crown of the outlet air lock K, effectually sealing it so that no water can escape from the bed. Continuing to rise it overflows the open pipe of the release W-trap

E (see special detail), closing this vent of air lock A in anticipation of the transfer to it of the air which will stop the flow. Rising further it overflows into the distributing tiles N, which, laid with open joints, carry the liquid to all parts of the bed. As the bed fills the water rises in the well until it climbs the weir L and floods the chamber containing the bells C and D. The air in C is driven into the crown of air lock A, shutting off the flow. The air in D is driven to the release trap E *of the next unit,* blowing out its seal and permitting the escape from the crown of air lock A *of that bed* of the air which prevented the flow of sewage through it. At the same time the blowing out of the second release trap E releases the air confined in the crown of the *outlet* air lock K *of the second bed back* in the cycle, allowing that bed to empty. As the water subsides the withdrawing siphon F and the differential drain pipe G empty their respective chambers, admitting air again to bells B, C and D in anticipation of the next cycle.

Special air valves J permit the cutting out from the cycle of any bed or beds, without interfering with the sequential operation of the other beds.

After deducting the space occupied by the septic tanks and the distributing chamber, the remaining area of the great circle is divided into six equal tracts. Each of these has a liquid capacity of 150,000 gallons, or two hours' average flow on a basis of 1,800,000 gallons per day. (Its initial capacity will be somewhat greater, but this will be speedily reduced to the constant working capacity by the formation of bacterial jelly, etc.) Each bed is filled to a depth of six feet, preferably with 72-hour foundry coke, broken and screened to chestnut size; or broken stone, clean and free from screenings, will answer. Over this filling material, which reaches to the water line, is placed a six-inch layer of coarse, clean broken stone, which serves several functions.

(1) It acts as a screen and prevents the choking of the filtering surface with dead leaves, paper, dust, etc.

(2) It holds above the water line the blanket of snow and ice in winter.

(3) By providing a dead-air space it conserves the heat of the sewage.

(4) It excludes light and thereby favors bacterial action.

(5) Being above the water line it is always dry, clean and sightly. It is impossible to tell from observation whether a bed is full of sewage or resting empty.

(6) When coke is used as a filtrant it is useful in discouraging its theft for fuel.

When all six beds are in use and the flow approximates 1,800,000 gallons per day each bed will make two complete cycles each day, and each cycle will be:

(a) Filling, two hours.

(b) Standing full, two hours.

(c) Emptying and draining, two hours.

(d) Standing empty (aerating), six hours.

Operated in this way aerobic conditions will be markedly stimulated and a good degree of purification (for single filtration) may be confidently expected.

I also hand you herewith plan showing the subdivision of the town into sewage districts, with profiles of each. The latter have been approved by the State Health Commissioner.

It will be necessary for you to forward the blue prints and tracings of all of these plans, together with a copy of this letter descriptive of the disposal plant, to the State Department of Health for its approval, and they will retain the tracings and return the approved blue prints to you.

Very truly yours,

DENNISON FAIRCHILD,

Town Engineer.

WATER EXAMINATIONS.

During the year the purity of the water supply of the following municipalities was investigated:

ALBANY, N. Y., *January* 4, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—In connection with your proposed visit to the village of Albion for the purpose of investigating as to the needs of a sewer system, you are requested to investigate as to the present public supply of water, complaint having been made to this

Department that such supply is mainly derived from the Erie canal.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ALBION, N. Y., *January* 4, 1904.

DANIEL LEWIS, M. D., *Albany, N. Y.:*

Dear Sir:—Your favor of December 30th to hand. I send to-day one gallon of water from the Albion Water Works Company to Professor Tucker; also the water for bacteriological examination to the Bender Hygienic Laboratory.

Note what you say about sending a man here to look into the matter.

I have proof that the water works company are pumping water from the Erie canal into the stand pipe. The water from the canal may be good water for the village to use, but I should hardly think so. Have advised people using it to boil same. If you should see Mr. Sanford Church, who is connected with your Department, he can tell you fully just what the condition is here.

Very sincerely,

ARNOLD E. WAGE,

Health Officer.

ALBANY, N. Y., *January* 11, 1904.

DANIEL LEWIS, M. D., *Commissioner State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Arnold E. Wage, health officer at Albion, N. Y. Specimen dated January 4th; received in frozen condition January 6th; analysis started next day.

Agar plates showed 320 organisms per cubic centimeter. Gelatin plates showed 195 organisms per cubic centimeter. There was no gas in any fermentation tube.

This water is therefore passed.

We have consulted with Prof. Tucker, as directed, in regard to the chemical analysis of the same specimen, before submitting this report.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *January* 12, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith report in duplicate, on the analysis of a sample of water received by your order on the 5th inst., from Dr. A. E. Wage, health officer, Albion, N. Y. Like the previous sample, examined in December and reported on December 15, 1903, the water is of satisfactory quality, although it is in most respects somewhat inferior to that sample (No. 736). This sample has also been examined at the Bender Laboratory and found of satisfactory quality on bacteriological examination.

Very respectfully yours,

W. G. TUCKER,

Director.

Analysis of Potable Water No. 741.

(Results are parts in 100,000.)

Received from Dr. A. E. Wage, Health Officer, Albion, N. Y.; date received, January 5, 1904; source, no particulars stated; how labelled, "Taken from Albion Water Works Company;" appearance, color, light greenish tint; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 1.90; free ammonia, 0.0013; albuminoid ammonia, 0.0040; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3440; total solids, 35.80; loss on ignition, 13.60; behavior during ignition, no change; mineral matter, 22.20.

Remarks: This water is in most respects slightly inferior to sample examined in December last (No. 736), but is nevertheless of satisfactory quality.

Bureau of Chemistry, January 12, 1904.

W. G. TUCKER,

Director.

SCHENECTADY, N. Y., *January* 14, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—Agreeable to your letter of instruction of January 4th I have to report that I visited the village of Albion, N. Y.,

on the 9th inst. and made an examination of the conditions attending the water supply of the village, concerning which complaints as to the quality of the water have been received by you. My examination shows the following conditions to exist:

The public water supply of the village is furnished by a private company styled the Albion Water Works Co. of which the following description is given: The company was incorporated under the laws of New York in 1887 or 1888; the principal place of business is Albion, N. Y. The officials are: E. F. Kizer, President and Treasurer, Towanda, Pa.; ——— Lilley, Secretary, Towanda, Pa.; O. D. Eddy, Superintendent, Albion, N. Y.

The company was granted a franchise to operate in the village of Albion by the village trustees in 1887 which franchise also comprised a five year contract to furnish the village with water for fire and other public purposes and which also regulated the sale of water to private consumers. The contract has been renewed at the end of each five-year period, being last renewed in 1903. The franchise stipulates substantially that the water supply shall be pure and wholesome and that the source of supply shall be beyond the influence of sewage pollution. The system first went into operation in September 1888. A large proportion of the population uses the public water supply as very many of the private wells are either actually polluted or are suspected to be by privy vaults and cesspools since the village is an old one and has no public sewer system. The company's pumping station is located west of the village in the township of Albion outside the village and about five hundred feet north of the Erie canal. The supply is drawn primarily from a system of ten drive wells and one large dug well, all situated within 300 feet of the station. The drive wells vary from 35 to 110 feet in depth, the more shallow ones stopping in a water-bearing gravel overlaid by sand, clay and surface muck. The deeper wells extend through the water-bearing gravel into clay and the deepest ones extend to rock. Little or no water is secured from the deep wells.

Early in the use of the system it became evident that the wells unaided were not furnishing the necessary amount of water, and the company, as a means of supplementing the natural supply from the wells, dug a system of narrow basins or trenches along each side of the line of wells and a larger basin near the wells.

These basins are, during the canal season, kept supplied with water from the canal by two pipes extending from the canal; one an eight-inch pipe leading into the large basin, from which the water may percolate and may also overflow into the trenches, the other a smaller pipe leading into a small natural waterway with which the trenches are connected and across which waterway below the trenches a small dam has been built by the company to hold back the water and throw it back into the trenches. The excavation for these basins extend in places through the impervious surface soil and into the sand and gravel from which the wells draw their supply, so that the water from the basins or trenches tends to percolate down into the ground-water near the wells, and thus into the wells. The trenches are so near the wells that when the trenches are full the water stands around and in contact with the tubes of some of the wells, and it was stated to me by one of the most prominent and reliable citizens of Albion that he had recently seen the water in the trenches passing down the outside of some of the well tubes.

The canal at this point derives the greater portion of its water supply from Tonawanda creek and from Lake Erie at Buffalo, both highly polluted sources, and on the flow easterly this pollution is still further greatly increased at Lockport, Medina and a number of smaller villages and hamlets in addition to the pollution from the canal boats.. The canal water is therefore clearly unsafe for potable use even after receiving the uncertain and probable slight improvement from the slight filtration it receives in its percolation through the short length of gravel intervening between the bottom of the trenches and the bottoms of the well tubes. In my opinion, its use is attended with great danger and should under no circumstances be permitted.

I beg to recommend that the proper local authorities be instructed to notify the responsible officials of the water company that the furnishing of canal water in the manner above stated as a part of the public water supply of the village of Albion is a menace to health and must be discontinued; and further that as a necessary protection against the passage of surface water, whether from the canal or elsewhere into the wells without adequate and long-distance percolation, the trenches surrounding the wells and all the low depressions near the wells be filled up with

clean gravel, sand or natural soil free from organic matter and smoothly graded so that water may not collect nor stagnate near the wells.

There is no doubt in my mind that a considerable portion of the supply furnished the village during the late years has been drawn more or less directly from the canal; and that when this portion of the supply is shut off, as it unquestionably should be, the company will suffer a deficit in meeting its full requirements for public and private consumption in the village. To make good this deficit, it would seem from all the information I could gather during my short stay at Albion that the present well supply proper may readily be supplemented to the necessary extent by extending the number of the wells in the present system whether as a permanent measure or as a temporary expedient. It should not be a matter of difficulty for the company to determine the direction of flow of the body of ground-water from which they are drawing and also the most suitable direction in which to extend the wells. The carrying out of such an extension need be a matter of but a few weeks time at most and should be undertaken and completed promptly, even though a totally different source of supply be contemplated, since the latter would consume at best several months, during which the health of the public in Albion should not be jeopardized, nor the fire risk increased by an inadequate fire supply.

It is proper here to state that at the time the two sets of samples of water sent you in December and January were drawn from the village system, no canal water was entering the wells nor the trenches nor had there been for some days previous; so that the samples analyzed were evidently well water proper.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

Albany, N. Y., *January* 23, 1904.

Mr. Martin Kiska, *President Board of Health, Village of Albion, Albion, N. Y.:*

Dear Sir:—I enclose herewith for the information of the Board of Health of the village of Albion, copy of a report made to this

Department by Prof. Olin H. Landreth, covering his recent investigation as to the condition attending the public water supply of the village, and advise that the recommendations contained in the report be complied with by the Board of Health of the village.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *February* 6, 1904.

MR. E. F. KIZER, *Manager and Treasurer, Albion Water Works Co., Towanda, Pa.:*

Dear Sir:—This Department sent to you under date of January 23, 1904, a copy of the report made to it by Professor Landreth, covering his investigation of complaints received as to the quality of water being furnished to the village of Albion by the Albion Water Works Co.

You are requested to inform me, what, if any, action has been taken by the Albion Water Works Co. to remedy the quality of water furnished to the citizens of Albion.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBION, N. Y., *February* 6, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

My Dear Sir:—The report of Olin H. Landreth, concerning the purity of the water supply of Albion, New York, reached me today, and I have given the matter my careful consideration which I herewith respectfully submit.

On page two of Mr. Landreth's report I note an error in regard to the depths and water supply of our wells. He says: "The drive wells vary from 35 to 110 feet in depth, the more shallow one stopping in a water-bearing gravel overlaid by sand, clay and surface muck. The deeper wells extend through the water-bearing gravel into clay and the deepest ones extend to rock. *Little or no water is secured from the deep wells.*" That last statement, which I have underlined, is an absolute error. The "deepest wells" have always produced an abundant flow of pure water,

up to the present time, when, as you are aware, the rainfall for the past few months, has been too slight to make any impression on the wells. The drive wells, run from 45 to 135 feet in depth, instead of the "35 to 110 feet" of Mr. Landreth's report. The deepest wells extend at least 100 feet into the rock—and have hitherto yielded water in abundance, as I stated on the second page of this letter. Another error in Mr. Landreth's report—concerning our basins or trenches. Mr. Landreth says: "Early in the use of the system it became evident that the wells unaided were not furnishing the necessary amount of water, and the company, as a means of supplementing the natural supply from the wells, dug a system of narrow basins or trenches along each side of the line of wells, and a larger basin near the wells." This company was incorporated in 1887—or 1888,—and the "basins" or "trenches" of which Mr. Landreth speaks, were built about five years ago, but up to the present time had never been used. The trenches at the side of the wells, were dug at the time the system was put in, to carry off the surface water, so as not to flood the wells in times of spring freshets,—or whenever we have heavy rains. The only pipe in use is a 6-inch pipe leading from the canal into this basin or pond. The "prominent and reliable citizen of Albion who stated that he had recently seen the water in the trenches passing down the outside of some of the well tubes" was ex-County Judge I. S. Signor, who unreservedly qualified his statement to me, by saying "well, it was running into the trench *near the wells*," which you will note is quite a hedge from his other sweeping statement. These wells are at least six feet from the trench of which Judge Signor speaks so fluently, and the pond or basin is from 12 to 15 feet from this trench, and also when I assure you that the top of casings to the wells are at least four feet higher than high water mark, you will readily see that it is an impossibility for the water from this trench to flow into the wells,—unless, indeed, the sprightly microbes *walked* over there on their feet.

I find, that a great share of Mr. Landreth's information came from W. H. Eggleston, a discharged employee, who has said and still makes his boasts, that he will ruin the company and put us out of business. He accompanied Mr. Landreth when that gentleman examined our plant, and doubtless furnished him with

much weird information. Mr. Landreth is in error too, when he states that the "two sets of samples of water sent you in December and January were drawn from the village system, and no canal water was entering the wells nor the trenches, at that time, nor had there been for some days previous." The second sample of water that was sent you for analysis, was as thoroughly impregnated with canal water as it is now at the present time, or at any time since the water was turned on. In closing, I beg to assure you, that when Almighty God in his goodness, sees fit to send us rains, or a thaw, then we will be only too happy to dispense with even the limited amount of canal water we are at present obliged to make use of in the trenches. None but madmen, would think it possible to locate new wells at the present time, with the "beautiful snow" three feet on a level and the ground frozen harder than the heart of a mummy three thousand years old.

I remain, my dear doctor, yours cordially,

OSCAR D. EDDY,
Superintendent Albion Water Works Co.

ALBION, N. Y., *February* 8, 1904.

Mr. D. LEWIS, *Health Commissioner, Albany, N. Y.*:

Dear Sir:—The copy of the report of Professor Landreth of January 23d duly received and I have at once consulted the Village Attorney, Mr. F. Tompson. He has informed the Water Works Company of this village that they must within four months from date discontinue the use of canal water for private and public purposes.

However, we will hold another meeting in regard to this matter and will let you know the result as soon as possible.

Respectfully yours,

M. KISKA,
President Board of Health, Village of Albion, N. Y.

SCHENECTADY, N. Y., *March* 21, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.*:

Dear Sir:—On February 11th you sent me a copy of a communication from Mr. Oscar D. Eddy, Superintendent of the Albion Water Works, criticising certain statements made by me in my report on the Albion water system, dated January 14th.

While I do not know that the communication warrants a reply, it may be proper to make the following statements, as a failure to do so may possibly be construed into an admission of the correctness of the criticisms.

Mr. Eddy personally furnished me with a large part of the information used in my report and all or nearly all of the facts recorded by me were either derived directly from him or were submitted to him for verification. Our conversation nearly all took place in the presence of Dr. Wage, health officer of the village of Albion. The information concerning the depth of wells and the flow from them came directly from Mr. Eddy himself and was recorded in my note book on the spot. A reference to Mr. Eddy's communication concerning the basins or trenches will show that he plainly contradicts himself and that one of his contradictory statements agrees with my report as to the trenches having been in use a long time. It is not at all impossible that *one* of these basins may have been built as recently as five years ago. It is not the case that the wells are 6 feet removed from the nearest points of adjacent trenches; the high-water line in these trenches comes *very near* to all of the walls and extends around some of them and it is no answer to state that the *top* of the casings are at least 4 feet higher than high-water mark as Mr. Eddy states, as no one has claimed that the water enters the wells through the top but it is claimed that it percolates down through the soil around and near the wells with inadequate purification and enters the wells through their lower ends.

The information concerning the dates when the two samples of water were taken and sent to Albany for examination, was given by Dr. Wage, and the time when the use of canal water was discontinued was given to Dr. Wage by Mr. Eddy himself in my presence; Mr. Eddy showing conclusively that on the dates when the second sample of water was selected canal water could not possibly have been entering the wells, nor even the trenches or basins.

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

TOWANDA, PA., *February* 9, 1904.

MR. DANIEL LEWIS, M. D., *Albany, N. Y.:*

Dear Sir:—In reply to yours of February 6th relative to letter sent me under date of January 23d, would say that the letter was forwarded to the writer at Tarpon Springs, Fla., hence the delay in answering, and I have forwarded it to Mr. O. D. Eddy, Superintendent of the Water Works at Albion, and requested him to answer it.

Your informant is certainly mistaken about the shortage of water at Albion, N. Y., for this is the first complaint that we have ever heard either of quality or quantity of the water.

The company has a plot of land suitable for a reservoir at Eagle Harbor. This was bought several years ago with the view of building a reservoir for a reserve to draw on in case of continued drought or any shortage which might occur to the present supply.

The rate charged for water at Albion is very low and the taxes are very high, owing to this fact the company has never had any money to build a reservoir. Mr. G. W. Kipp owns one-half interest in the stock of the Albion Water Works, and he is now in Florida; but as soon as he returns, which I think will be about April 1st, I would like to arrange to have you either send a representative or meet us at Albion, and we will examine the proposed reservoir site, and if satisfactory will build a reservoir to be used in emergency or would drill more wells if we are convinced that we would find more water by doing so.

Regretting the unavoidable delay in answering, I remain,

Yours truly,

E. F. KIZER.

ALBANY, N. Y., *April* 9, 1904.

DANIEL LEWIS, M. D., *State Department of Health, Albany, N. Y.*.

My Dear Sir:—In regard to the water supply of this village You remember some few weeks ago your Mr. Landreth came here and looked the present plant over, and that he found same in rather bad condition. The local Board of Health here have taken steps to have the use of the water stopped as you directed. The company have located springs in two different places and are ready to start operations to pipe the water into Albion. I would like very much to have you send some one to Albion so that you

may know the exact plan and whether you would consider the source of the water to be O. K.

The company are very anxious to start operations, but I have advised then not to do so until the plan was approved by the State Department. Can you send me a man this week? I am anxious to have the new system in before warm weather, as a good many people will continue the use of our so-called filtered canal water. Of course the water in the canal is not as bad now as it will be in two months from now. Kindly advise as soon as possible.

Very sincerely,

ARNOLD E. WAGE,

Albany, N. Y., *April* 14, 1904.

Mr. J. James R. Croes, *Consulting Engineer, State Department of Health, Morris Building,* 68 *Broad Street, New York City:*

Dear Sir:—I enclose herewith, papers in connection with an investigation made by Prof. Landreth, concerning the Albion water system.

I am informed that the owners of the plant, the Towanda Water Works Co. of Towanda, Pa., are about to secure water from another source and desire to confer with a representative of this Department concerning the same. As Prof. Landreth is busy with other matters, could you arrange to visit Albion? If so, communicate with the President of the Board of Health, Mr. Martin Kiska, who will arrange to have a representative of the water company meet you.

Kindly return the enclosed papers with your report.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

Albany, N. Y., *May* 17, 1904.

Daniel Lewis, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report of the two specimens of water received from Mr. J. J. R. Croes, C. E., at 68 Broad street, New York. Specimens dated May 11th; received here May 12th; analyses started May 14th.

Specimen No. 1—marked "Pump of Albion, N. Y., Water Co." Agar plates showed 5000 organisms per c. c. Gelatin plates were liquefied with an ammoniacal odor. There was gas in three fermentation tubes, in which it was not of the colon type.

This water is passed.

Specimen No. 2—marked "Otter Creek at Eagle Harbor near Albion." Agar plates showed 3100 organisms per c. c. There was gas in four fermentation tubes, in which it was not of the colon type. Gelatin plates showed 5000 per c. c.

This water is also passed.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *May* 23, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith reports in duplicate on the analysis of three samples of water received by your order on the 17th instant from Dr. Arnold E. Wage, Health Officer, Albion, N. Y.

These samples were sent by and with the advice of Mr. J. J. R. Croes, C E., as I am informed. As stated in the reports the sample taken from the present public water supply is of good quality, while that from the Otter creek is not very satisfactory, and that from the Erie canal is quite unfit for domestic use. I am informed by the Director of the Bureau of Pathology and Bacteriology that samples of water from Otter creek and the present supply, which I infer correspond to samples Nos. 771 and 772 now reported upon, have been examined by him and found of satisfactory quality.

Very respectfully,
W. G. TUCKER,
Director.

Analysis of Potable Water No. 771.

(Results are parts in 100,000.)

Received from Dr. A. E. Wage, health officer, Albion, N. Y.; date received, May 17, 1904; source, Otter creek; how labelled,

"Water taken May 13 from Otter Creek;" appearance, color, decided yellowish tint; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 0.70; free ammonia, 0.0045; albuminoid ammonia, 0.0315; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.0384; total solids, 34.20; loss on ignition, 10.40; behavior during ignition, blackened; mineral matter, 23.80. Remarks: Nitrates present and albuminoid ammonia high; not of very satisfactory quality; inferior to No. 772 but superior to No. 773.

Bureau of Chemistry, May 23, 1904.

W. G. TUCKER,
Director.

Analysis of Potable Water No. 772.

(Results are parts in 100,000.)

Received from Dr. A. E. Wage, health officer, Albion, N. Y. Date received, May 17, 1904. source, present water supply of village; how labelled, "Water taken from Albion Water Works Co.'s plant, May 14;" appearance: color, nearly colorless; turbidity, none; sediment, none; odor at 100 degrees F., None; chlorine in chlorides, 1.40; free ammonia, 0.0005; albuminoid ammonia, 0.0020; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.3240; total solids, 25.60; loss on ignition, 9.40; behavior during ignition, no change; mineral matter, 16.20. Remarks: Quite similar to sample of same water examined December 15, 1903 (No. 736), and superior to sample examined January 12, 1904 (No. 741). This water is of good quality and much superior to either of the other samples accompanying it.

Bureau of Chemistry, May 23, 1904.

W. G. TUCKER,
Director.

Analysis of Potable Water No. 773.

(Results are parts in 100,000.)

Received from Dr. A. E. Wage, health officer, Albion, N. Y. Date received, May 17, 1904; source, Erie canal at Albion; how labelled, "Water taken from Erie canal where pipe is connected with Albion Water Works;" appearance: color, light brownish tint; turbidity, distinct; sediment, slight; odor at 100 degrees F., none; chlorine in chlorides, 1.30; free ammonia, 0.0160; albuminoid ammonia,

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0.0140; nitrogen as nitrites, 0.0036; nitrogen as nitrates, 0.0212; total solids, 20.80; loss on ignition, 8.20; behavior during ignition, blackened; mineral matter, 12.60. Remarks: Appearance not good; chlorine high for surface water; free ammonia and nitrogen in nitrites high. Inferior to the two samples accompanying it. Unsatisfactory quality and unfit for domestic use.

Bureau of Chemistry, May 23, 1904.

W. G. TUCKER,
Director.

NEW YORK, *May* 27, 1904.

HON. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Sir:—In accordance with your instructions I visited Albion, N. Y., on May 11th, and examined the conditions existing with reference to the water supply of the village.

I was accompanied by Mr. Martin Kiska, the President of the Albion Health Board, Mr. E. F. Kizer, the President of the Albion Water Company and Mr. Oscar D. Eddy, the Superintendent of the Water Company. I also met Dr. Arnold F. Wage, health officer of the village.

As described by Professor Landreth in his report of January 14, 1904, the supply is drawn from eight driven wells, in swampy ground north of the Erie canal, and on tubular iron well 22 feet in diameter and 25 feet deep.

The driven wells are said to be from 45 to 135 feet deep. The water is said to rise to the surface when the pumps are not running. At the time of my visit, two steam pumps and one electric pump were in operation and the water in the open well was fifteen feet below the surface.

At the present time these wells supply the demand and the water as shown by the analyses of the State chemist and bacteriologist, is suitable for domestic use.

During the past winter there were several occasions when the yield of the wells was insufficient to keep up the supply and water was drawn from the Erie canal through an eight-inch pipe, into a basin on the surface near the wells and reached the wells by percolation through the gravel.

This practice is said to have been continued as late as March 15th.

At the time of my visit the basin was dry and had evidently not contained any water for some time.

A sample of the water which the pumps were supplying to the village at that time was taken by Dr. Wage as was also a sample of the water in the canal, and sent to the State Chemist for analysis and his report pronounces the former to be good and the canal water to unfitted for domestic use. Whether it can be made fit for use by simple percolation through 25 to 50 feet of surface gravel and admixture with the ground water, can only be determined by analysis. It is doubtful whether it can be sufficiently purified by this process. Its use should be peremptorily forbidden.

It is clear, from the experience of the last winter, that an additional supply is needed for Albion at once. In the absence of detailed examinations of the surroundings, the simplest and easiest way to obtain such additional supply appears to me, as it did to Professor Landreth, to extend the driven well system, going perhaps a mile or two further down the water-course at the head of which the present wells are located.

Dr. Wage and Mr. Eddy are disposed to think that an additional supply can be procured by piping the water from a spring, some two or three miles south of the pumping station and at a higher elevation. I did not examine this source, because Mr. Kizer positively declined to take this water on account of the insufficiency of the source, which he stated that he had examined. I think it probable that his view is correct. A surface spring near the summit of a range of hills, is very apt to furnish a very limited amount of water at any time and to yield little or no water at the time that it is needed. It might be well, however, to procure from Dr. Wage, samples of the water for analysis. It is probably a fairly good water, but too limited in quantity to warrant a large expenditure for its utilization.

At the suggestion of Mr. Kizer we visited a point on Otter Creek at Eagle Harbor Mill, where the stream passes under the Erie canal about two miles west of the water works pumping station, and where the water company claims to possess the right to construct a storage reservoir.

The location appears to be admirably adapted for the purpose. The creek at this point receives the drainage of about fifteen square miles of very sparsely populated territory, largely wooded. There is a good site for a dam which would create a larger storage reservoir and enable a supply of at least half a million gallons a day to be pumped by water-power to the wells and pump station, without affecting the flow of water to the owners of water rights on the stream below the dam and without the necessity of laying a pipe under the Erie canal, there being a large culvert at that point.

The bacteriological analysis of the water from the stream seems to be a little better than that of the water from the wells, but the chemical analysis presents some anomalies which I do not understand after seeing the stream and its surroundings. I was not present when the sample for chemical analysis was procured by Dr. Wage.

The accompanying map prepared from the U. S. topographical sheets, shows the relative location of the village and the sources of supply.

I respectfully recommend that the flooding of the land around the wells, with water from the Erie canal, be forbidden; that the water company be advised to make immediate efforts to extend the driven well system; that the samples of the spring water alluded to be analyzed and if it is satisfactory, permission be given for its temporary use as an adjunct to the present supply, with the cautionary statement that its sufficiency as a permanent aid to the supply is extremely doubtful; and that the water company be requested to furnish to the Department monthly samples of water from Otter creek, near Eagle Harbor mill, for analysis, until January, 1905.

The papers sent me in the case are returned herewith.

Respectfully submitted,

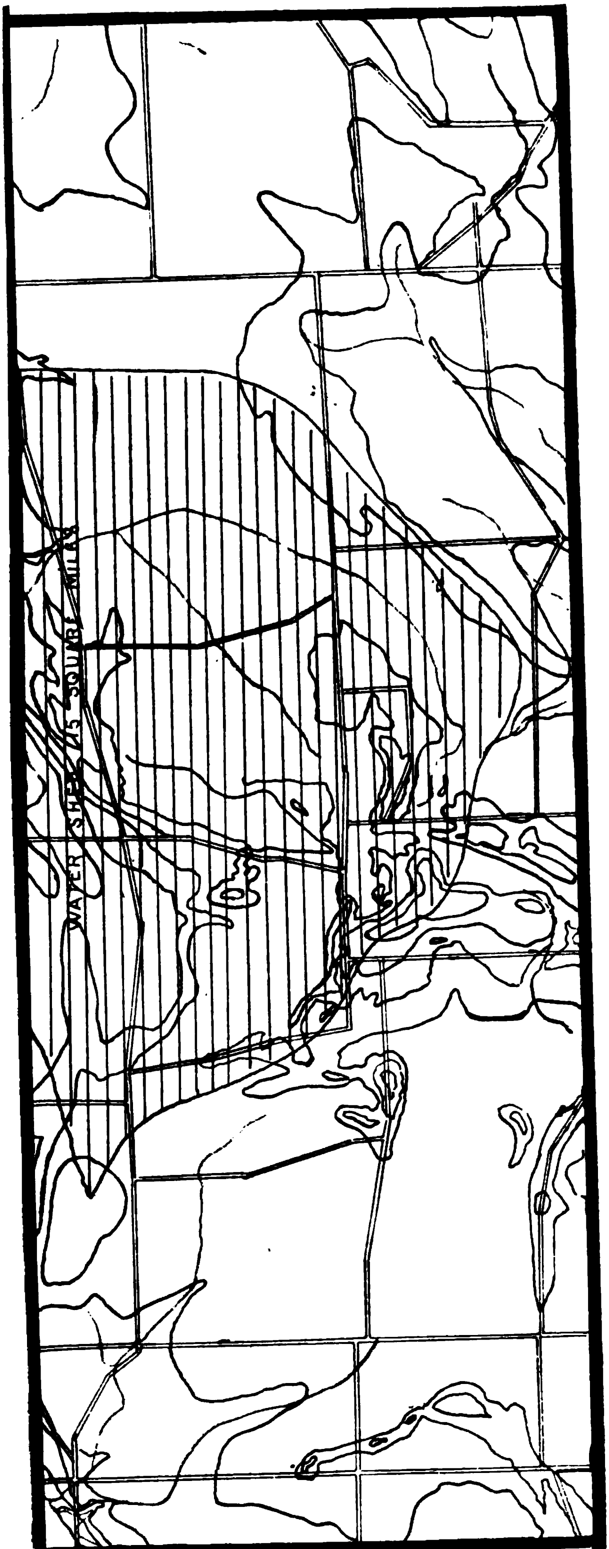
J. J. R. CROES,

Consulting Engineer.

ALBANY, N. Y., *June* 1, 1904.

ARNOLD E. WAGE, M. D., *Health Officer, Albion, N. Y.:*

Dear Sir:—I enclose herewith, copy of a report made by Mr. J. J. R. Croes, C. E., one of the consulting engineers of this De-



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partment, upon his investigation as to the conditions existing at Albion, N. Y., with reference to the public water supply of that municipality.

You are requested to present the report to the Board of Health of the village of Albion with the information that it is instructed to prohibit the Albion Water Company from using water from the Erie Canal as any part of the supply furnished by it to the village of Albion.

It is further directed that the Albion Water Company be notified that it will be required to show by means of monthly bacteriological and chemical examinations that the water furnished by it to the village of Albion is of such degree of purity as to be considered safe for drinking purposes.

In view of the recommendations made by Mr. Croes, it is advised that the water company take immediate steps to extend its driven well system.

A sterilized water bottle has been sent to you that you may procure and forward for analysis, a specimen of the spring water referred to in the report.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

P. S. It is further directed that the Albion Water Company be requested to furnish the State Department of Health with copies of monthly reports covering chemical and bacteriological examinations of specimens of water taken from the public supply.

AUBURN, N. Y., *May* 15, 1904.

DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

My Dear Sir:—I am directed by the Board of Health of this city to correspond with you regarding the protection of our water supply. Tests made in your laboratory during the past year have determined that the water is contaminated with sewage matter and we desire your advice as to the proper steps to be taken for the protection of Owasco lake.

The inlet drains the villages of Moravia, Locke and Groton. These towns are three miles and more from the lake proper. The

lake is eleven miles long. Along its shores are two hotels and over one hundred cottages and farm houses.

It is a question whether we should ask for rules for our protection or take up the matter under the law passed in 1903 for the protection of waters of the State.

If you will be good enough to give us the benefit of your opinion the board is ready to carry the matter to a finish. I think the members are fully convinced of our danger, finally, and will act promptly.

Yours respectfully,

A. H. BROWN,

Health Officer.

ALBANY, N. Y., *May* 23, 1904.

A. H. BROWNE, M. D., *Health Officer, Auburn, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 15th inst., referring to the pollution of the waters of Owasco Lake which are used as a source of water supply of the city of Auburn, and note your request to be advised as to the proper course to pursue in order to secure the necessary protection from pollution of such water supply.

In reply you are informed that the villages of Moravia, Locke and Groton having discharged their sewage into the inlet prior to the passage of chapter 468 of the laws of 1903, such law of course would not affect the villages named other than to prohibit any increase of pollution from those villages, and it would therefore seem that the only proper course for the city of Auburn to pursue in order to protect its water supply is to formulate rules to be presented to this Department for approval.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ALBANY, N. Y., *June* 3, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—This department is in receipt of a request from Dr. A. H. Brown, health officer of the city of Auburn, to detail someone to make an inspection of Owasco Lake, which is the

source of water supply of the city of Auburn, and to make such rules and regulations as may be deemed necessary to protect the waters of the lake from contamination.

You are requested to visit Auburn for the purpose stated and you are requested to notify Dr. Brown when it will be convenient for you to make the investigation.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *May* 19, 1904.

W. J. BURNS, M. D., *Health Officer, Town of Oyster Bay, Sea Cliff, N. Y.*:

Dear Sir:—This Department is in receipt of the following communication from Mr. J. J. Karbry O'Kennedy:

"I am requested by a number of friends of mine who make their summer home at Bayville near Oyster Bay, Long Island, to call your attention to the water supply out there.

A large number of families who have purchased their plots from the Godfrey estate receive their water supply from an old reservoir through pipes laid by the Godfrey estate. This reservoir is never cleaned and the foul poisonous water from it is the only drinking and cooking water obtainable and an epidemic may break out there at any time. Mrs. Godfrey has been warned but refuses to act. Hoping your board can remedy this, I am." . . .

You are requested to inform us what you know as to the above complaint, also forward a sample of the water for bacteriological examination, a bottle for which use has been sent to you under a separate cover.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

SEA CLIFF, L. I., *May* 31, 1904.

DANIEL LEWIS, ESQ.:

Dear Sir:—I have sent this day to Bender Laboratory sample of water taken from supply as furnished by Godfrey estate in Bayville. Also allow me to state that I made a survey of watershed, well, etc., and find well upon a hill but still below a cess-

pool of the Arlington Hotel; said pool being 500 feet from well, a stable 300 feet from well, the reservoir is situated upon a high hill and is double screened; this reservoir was thoroughly cleaned this spring.

Another sample sent, that of Robinson in the village of Oyster Bay, is within 28 feet of a cesspool and is undoubtedly polluted.

If you will kindly give me the result of analysis I will act promptly in both cases.

Yours respectfully,
WM. J. BURNS.

ALBANY, N. Y., *June* 7, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear sir:—Following is the report on the two specimens of water received from Dr. William J. Burns, Health Officer at Sea Cliff, N. Y. Specimens dated May 31st; received here June 1st; analyses started next day.

Specimen No. 1.—from "Well." Agar plates showed 390 organisms per c. c. Gelatin plates were liquefied with a slight odor. There was gas formation in all tubes, in none of which was it of the colon type.

This water shows no evidence of organic contamination and is passed.

Specimen No. 2—from "Faucet." Agar plates showed 120 organisms per c. c. Gelatin plates were liquefied with a strong ammoniacal odor. There was no gas formation in any fermentation tube.

This water is also passed.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *May* 27, 1904.

MR. J. J. R. CROES, C. E., *Consulting Engineer, State Department of Health, Morris Building,* 68 *Broad Street, New York City:*

Dear Sir:—I enclose herewith copies of complaints made to this Department concerning alleged pollutions of the waters of Big

Moose lake in Herkimer county, by reason of the discharge therein of sewage from hotels, etc., located near the lake, the waters of which it is understood are used for domestic purposes.

As such disposition of sewage is in direct violation of the provisions of section 75 of the Public Health Law, I would be pleased to have you visit the locality referred to for the purpose of investigating the complaints.

Big Moose lake is in the town of Webb, Dr. Stuart Nelson of Old Forge being the health officer.

It might be well for you to arrange to meet Dr. Nelson at Old Forge and have him accompany you to the lake.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

NEW YORK, *July* 11, 1904.

Hon. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Sir:—Under your instructions I visited Big Moose lake in the Adirondacks, on June 23–24, to inquire as to alleged violations of the Public Health Law by the discharge of crude sewage into the lake.

At the time of my visit the season of general occupation of the hotels and private camps surrounding the lake had not opened fully and there were but few places where any sewage was being discharged into the lake.

I visited the hotels on the shores of the lake and found that in no instance was there any attempt made to purify the sewage from them prior to its discharge into the lake in front of the property.

The Glenmore Hotel, which is the nearest to the railroad station, can accomodate 75 guests. It is copiously supplied with water brought from a spring on the mountain side, is furnished with baths and waterclosets and all of its wastes are discharged into the lake in front of the house.

The garbage is said to be burned and fed to pigs which are kept some distance from the lake and the house. The hotel is owned by D. B. Sperry and is operated by Dart and Morrison. Mr. Dart also controls a hotel at Second lake, on the outlet from

Big Moose, which is said to have a copious water supply and to be provided with some sort of a "system" for disposal of the sewage.

The Martin Brothers, guides who have had a camp on the lake shore for several years, have recently erected two cottages which have water supply and modern plumbing and from which the sewage is discharged into leeching cesspools. Mr. Martin said that his intention was to keep all impurities out of the lake.

J. H. Higby's hotel and cottages accommodate 100 guests. The lake shore is a ledge of rock and the sewage is discharged directly into the lake 250 feet from the shore in 20 feet of water. Mr. Higby recognizes the impropriety of such disposal of sewage and expresses a desire to find some means of purification of the effluent.

H. H. Covey, at Camp Crag, has a hotel and three cottages on a rocky ledge. The sewage is discharged directly into the lake through two pipes which extend 60 feet from the shore.

Charles A. Williams, at Lakeview Lodge, has a hotel and cottages accommodating 75 guests. All the sewage is discharged into the lake. Mr. Williams seems to recognize the impropriety of this this, but says everybody else does it.

G. H. Burdick's camp accommodates 25 guests. Sewage discharged into the lake.

There are also about a dozen private camps around the lake, at none of which, so far as I can ascertain, are any precautions taken to prevent pollution of the lake waters by house wastes, except at the residence of Theodore A. Page on an island, where I was informed that the sewage was filtered before entering the lake. I was unable to verify this, the house being unoccupied at the time. Mr. Page is one of the largest owners of property on the lake shore.

The rocky nature of the shore and the location of most of the camps and cottages close to the water will probably make it necessary to pump house sewage some distance both horizontally and vertically to effect its purification before entering the lake. No general system can be recommended, but each case will have to be treated separately.

So far as could be learned, the lake water is not used by residents upon its shores, for drinking purposes. Copious springs

of excellent water abound on the hill sides which rise abruptly from the lake on all sides.

Respectfully submitted,
J. J. R. CROES,
Consulting Engineer.

CANTON, N. Y., *February* 26, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, Albany, N. Y.:*

Dear Sir:—As suggested in your favor of the 23rd inst., I have to-day forwarded you by express three bottles of water taken from different points in the village. You will kindly note that each sample is numbered and we would like very much to have your report on them by number, so that we will be thus enabled to locate should anything be found in them of a foreign nature.

Hoping to receive an early report, I am

Very truly yours,
J. FRED HAMMOND,
President.

ALBANY, N. Y., *March* 7, 1904.

DANIEL LEWIS, M. D., *State Department of Health, City:*

Dear Sir:—Following is the report on the specimens of water received from Mr. J. F. Hammond, president of the village of Canton, N. Y. Specimens received March 1st; analysis, March 2nd; final analysis, March 4th.

Specimen No. 1.—Agar plates showed 7400 organisms per c. c. Gelatin plates had a moderate odor, showed 50000 organisms per c. c. (estimated). There was a trace of gas in three fermentation tubes.

Specimen No. 2.—Agar plates showed 1100 organisms per c. c. Gelatin plates had a strong putrefactive odor, and showed 40000 organisms per c. c. There was gas in only one tube, in which it was of the colon type.

Specimen No. 3.—Agar plates showed 1700 organisms per c. c. Gelatin plates showed 18000 organisms per c. c. There was no gas formation in any of the fermentation tubes.

Though there is no evidence of organic contamination in specimen No. 1, it shows too high a bacterial count to be passed.

Specimen No. 2 is condemned for high bacterial count and organic contamination. Specimen No. 3 is passed.

Respectfully submitted,
R. M. PEARCE,
Director.

CANTON, N. Y., *May* 24, 1904.

STATE BOARD OF HEALTH, *Albany, N. Y.:*

Gentlemen:—Some time ago you made analyses of water for this village, the result of which did not tend toward good conditions. Since then we have had our standpipes and reservoirs cleansed, and we are sending you three samples, which we will be pleased to have you make an analysis, sending us the result.

We still have some typhoid in our midst, and are very anxious to know the condition of our water supply.

Very truly yours,
J. FRED HAMMOND.

ALBANY, N. Y., *May* 28, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the three specimens of water received from Dr. J. C. Willson, Health Officer at Canton, N. Y. Specimens received May 25th; analyses started next day. Water was not contained in Department bottles.

Specimen No. 1.—Agar plates showed 140 organisms per cubic centimeter. Gelatin plates were liquified with an ammoniacal odor. There was no gas formation in any fermentation tube.

Specimen No. 2.—Agar plates showed 210 organisms per cubic centimeter. Gelatin plates were liquified with a moderate ammoniacal and putrefactive odor. There was gas formation in three fermentation tubes, in none of these was it of the colon type.

Specimen No. 3.—Agar plates showed 630 organisms per cubic centimeter. Gelatin plates were partially liquefied with a moderate odor. There was no gas in any fermentation tube.

These waters are all passed.

Respectfully submitted,
R. M. PEARCE,
Director.

SCHENECTADY, N. Y., *November* 4, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—You recently requested me to visit the village of Chappaqua, Westchester County, N. Y., for the purpose of looking into the matter of an improvement of the drainage of the small stream flowing through that village forming the head waters of the Neperhan river.

In accordance therewith I visited Chappaqua on October 29th and met there Mr. Hugh Douglass, a permanent resident and a member of the Village Improvement Association, whose place of business is No. 387 Lexington avenue, New York, and also Mr. Bristol, a summer resident, whose place of business is No. 1 Madison avenue, New York.

The defective conditions to which attention was asked are as follows: The small stream above-mentioned together with a tributary of the same, reaches the village of Chappaqua with rather steep grades, but the grade of the stream through and below the village for a considerable distance is very flat and the stream meanders through land somewhat marshy. The stream receives at the village and above the village more or less organic pollution and moreover brings down during flood time certain quantities of silt and humus from the surface washings. The checking of the stream velocity on reaching the flat grade which begins at the village is the cause not only of considerable overflow and consequent flooding of adjacent properties, but also of extensive deposits of silt and organic refuse, which the stream is unable to transport at the diminished velocity resulting from the flattened grades. The result has been the continued accumulation of this material in the basin and the creation of a stream course which is not only sinuous, but which is at many places badly obstructed by rank growth of vegetation incident to the fertile soil formed along the course of the stream.

Chappaqua is an unincorporated village of about 500 inhabitants. It has no sewer system, but there are a number of private drains which discharge into the stream. The conditions to be rectified are, however, largely those of drainage and only incidentally relate to sewerage, although the latter conditions will soon demand attention from the village and in fact should receive early consideration.

The natural and proper remedies for the existing defective conditions are (1) the rectification of the defective stream conditions, including the improvement of the channel by judicious straightening, lowering and enlarging, (2) the immediate or future provision for sewerage which will be necessary not only as an essential village improvement, but also as a measure necessary to protect the stream from pollution. These two matters of drainage and sewerage must of necessity be clearly distinguished and separately considered, since under existing laws relating to the pollution of streams, watercourses cannot in future be used for the discharge of sewage except under certain conditions and by special permission; and also for the reason that the procedure for securing a drainage improvement is quite distinct from that necessary for sewerage. These two matters of drainage and sewerage will therefore be considered separately.

DRAINAGE.

Chappaqua lies in the township of New Castle, and the defective conditions above-mentioned lie largely within that township, though partly within the township of Mt. Pleasant, which adjoins New Castle just below the village of Chappaqua as the stream flows. The stream also flows into and through the incorporated village of Pleasantville, which is situated within the township of Mt. Pleasant. The time available during my examination did not admit of making a survey nor taking levels to determine how far the improvement of the stream channel should extend in order to secure the needed relief at Chappaqua, but it was the opinion of Messrs. Douglass and Bristol that it would be necessary to extend to and through the village of Pleasantville and that such improvement would be a matter of equal value to Pleasantville as to Chappaqua. So far as my hasty optical examination would indicate it appeared to me likely that adequate relief for Chappaqua could be obtained without extending the improvement to the village of Pleasantville, though a survey may show this impression to be erroneous. So far as drainage is concerned it does not matter materially whether the improvement all lay within the township of New Castle or extended into Mt. Pleasant, since the New York Drainage Law provides amply for a drainage improve-

ment which extends into more than one township, and in fact into more than one county. The drainage law under which this improvement would naturally be carried out is the General Drainage Law of 1869, with its numerous subsequent amendments. This law provides that any person or persons owning or possessing any swamp, low or wet lands desiring to drain the same, or any person or persons who shall deem it necessary for the public health that any such swamp, low or wet land should be drained, may present a petition duly verified to the county court of the county in which such lands lie. If the court is satisfied that such drainage is necessary it shall appoint a commission composed of three freeholders resident of the county who shall not be interested in such lands, and one of them shall be a civil engineer. This commission shall consider and determine, (1) whether it is necessary in order to drain such lands, that a ditch or ditches or other channels for the free passage of water shall be opened through lands belonging to others; (2) whether it is necessary for the public health that such lands should be drained, and to take such other and further steps as may be necessary. The law also provides that the commission may after due formalities prepare a survey and plan for the drainage improvements, and may construct the same and may levy and assess the cost thereof on all properties benefited by the improvement, and may determine what amounts shall be assessed on and paid by the respective villages and towns which may receive benefit through public health improvements. The commission is also empowered to provide for the distribution of the assessments over a stated period of years and to issue bonds, the interest and principal of which shall be paid out of the drainage assessments.

The above procedure is the only one available unless a voluntary mutual agreement can be reached between the owners of all lands concerned in the improvement and all persons who are benefited by the improvement. If such an agreement can be reached the proceedings would be entirely informal and unofficial and the successful execution of the improvement would depend solely on the force of the mutual agreement between the several parties to it. If this plan appears feasible the best procedure would appear to be:

(1) The selection by a mass meeting or by the Village Improvement Association, of a committee of three or five disinterested citizens, which committee should be instructed to have prepared a survey, plan and estimate of cost of the improvement.

(2) The committee should if it approve of the plan, as originally proposed or as subsequently modified, appraise the respective benefits to be secured by all beneficiaries, including the town or towns, if any, which might be benefited in general, and thereupon to prepare a provisional scheme of assessment of the total cost of the improvement, including survey, plans and engineering supervision, equitably upon the several beneficiaries.

(3) The preparation of a form of agreement to be signed by each of the beneficiaries, by which each one signing should approve the plan of improvement, authorize its execution under the general direction of the committee and bind himself to the payment of the contribution assessed against him by the schedule of provisional assessments. If any assessment is made against a town, it would be necessary of course to secure an appropriation from the town board for such assessment, and the signature of the town clerk to the general agreement, duly authorized by the town board would seem to be sufficient to make the town a party to the general agreement. It would probably be necessary to make the terms of agreement such that no signature should be binding until all parties included in the scheme of provisional assessments as finally adopted, shall have signed.

(4) The execution by the committee of the work of improvement in accordance with the plans, the collection of the assessments from the contributing beneficiaries and the payment of bills and expenses; with the filing of the final report by the committee would close and complete the undertaking.

Of these two distinct plans the latter is the more desirable if it can be carried out; but if there are interests or individuals who will not contribute to the undertaking, or who will not freely grant the right-of-way across their property, then the former regular legal procedure would be the only successful plan.

SEWERAGE.

As before stated, the circumstances of the case and the laws regulating the pollution of streams render it impossible to pro-

vide for both drainage and sewerage improvements in the same channel or outlet, and therefore the drainage improvement would offer no relief to any existing defective sewerage now or in future. On the contrary the stream should even now be relieved of some existing pollution from house drains or sewers which enter the stream, some of them rather indirectly, and the use of the stream as a sewer which has been permitted by sufferance in the few instances will soon have to be discontinued, as the stream is a water-supply stream and as water supply rights take precedence over sewerage rights. Wholly apart from this consideration, it would be a measure of great value to the unincorporated village of Chappaqua if it could secure a modern sewerage system adapted to its needs and capable of future extension as the village grows. Such a system with the necessary addition of a simple disposal plant would place the village in the line of modern progress and would thereby greatly increase its attractiveness as a desirable residential place for commuters and summer residents. Neither of these classes of population will settle where a fairly complete list of modern conveniences cannot be offered. Such a system as is needed by Chappaqua for the present and the near future is entirely within the reach of the community financially and if planned for a reasonable future growth need not be built all at once, but gradually as needed so long as the entire system is planned at first in order to insure completeness of the plans and adequacy to take care of future developments. The law provides a definite detailed procedure for the case of sewer systems to be built by unincorporated villages. This law forms chapter 348 of the laws of 1901.

This law provides for the establishment of a sewerage district by the town board of any town,—which district shall have a definite boundary,—and the town board may appoint a board of sewer commissioners which shall have power to procede to build a sewer system in much the same manner as the board of trustees or the village sewer commission of an incorporated village, including the provision for partial annual assessments and bonding as in villages. I will mail a copy of the bound Public Health Law, which contains this sewer law for unincorporated villages to Mr. Douglass for examination.

In view of the above considerations it appears desirable that the village should give attention to the question of sewerage at an early date and preferably at the same time it takes up the matter of drainage, and I therefore beg to recommend that this be suggested to the local authorities.

With these two much-needed improvements accomplished, Chappaqua would offer peculiar advantages as a suburban residence place, and would place itself in line with many other villages which have taken steps toward this sort of improvement, including the two neighboring villages of Bronxville and Mt. Kisco; the sewer system of the former was but recently completed and that of the latter recently designed and now ready for construction.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

ALBANY, N. Y., *January* 4, 1904.

H. W. STOUGHTON, M. D., *Chateaugay, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 2nd inst., referring to a brook which runs through the town of Chateaugay, and note your statement that the water of such brook is being polluted by refuse from a creamery, also by the discharge of sewage from farm houses.

As you state that the water of the brook is used for domestic purposes, it is the duty of your board to protect the stream from pollution.

You also say, "About one-third mile up the stream a farm house has put in drain pipes and connected with this stream."

If the farm house referred to has constructed the drain since May 7, 1903, such act is in violation of Section 75 of the Public Health Law as amended by Chapter 468 of the Laws of 1903, which provides as follows:

"No person, corporation or municipality, shall place or cause to be placed, or discharge or cause to be discharged into any of the waters of this State, unless the same shall have been permitted by the State Commissioner of Health, any sewage, garbage, offal, dead animal, dead fish, dead bird or part thereof, or any decomposable or putrescible matter of any kind or any substance,

chemical or otherwise, containing the same in quantities injurious to the public health."

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *August* 6, 1904.

MR. NELSON H. GESNER, *President Board of Health, Fishkill Landing, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 4th inst., in which you state that the local board of health is very much alarmed over the condition of the public water supply and ask that an inspector be sent to investigate the matter, and note your request to be advised as to the expense of same and by whom it should be paid.

In reply you are informed that we would be pleased to have you give us full information as to the cause of alarm that we may be competent to advise you in the matter.

Should it be necessary to send a sanitary engineer to Fishkill Landing, it would be at the expense of your municipality and the cost of same would depend upon the amount of work done.

The usual charge of the Sanitary Engineer is $20 per day and expenses.

I have sent you two sterilized water bottles with the suggestion that your health offcer procure and forward specimens of the water to us, which we will examine for you without expense; have him procure one sample from the reservoir and the other from a tap in the village.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *August* 12, 1904.

J. E. MOITH, M. D., *Health Officer, Fishkill-on-Hudson, N. Y.:*

Dear Sir:—I enclose herewith for your information, copy of a report made by Dr. R. M. Pearce upon his examination of two specimens of water submitted by you.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *August* 11, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the two specimens of water received from Dr. J. E. Moith, Health Officer at Fishkill-on-Hudson, N. Y. Both specimens dated August 8th; received here August 8th; analysis started August 8th. Both specimens from same source and taken at same time.

Specimen No. 1—"Faucet." Agar plates showed 180 organisms per c. c. Gelatin plates were not liquefied. There was gas formation in all fermentation tubes, in none of which was it of the colon type.

Specimen No. 2—"Faucet." Agar plates showed 550 organisms per c. c. Gelatin plates were not liquefied. There was gas formation in all tubes, in one of which there was a trace of colon type.

You will note the one colon formula in specimen No. 2, also there is gas in the other four tubes. Although this shows that the water is not as good as it should be the fact that only one colon formula is found and that the count is low, being only 550 per c. c., we cannot condemn the water.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *November* 17, 1904.

Mr. M. S. STRONG, *Secretary Board of Health, Granville, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 16th inst., stating that you have been instructed to send for eight water jars for use in forwarding samples of water to be analyzed.

In reply, you are requested to inform us whether chemical or bacteriological examinations are desired, also furnish us with reasons why such examinations are deemed necessary.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

GRANVILLE, N. Y., *November* 18, 1904.

New York State Department of Health, Albany, N. Y.:

Gentlemen:—Replying to yours of the 17th will say that the examinations desired are bacteriological, and the reasons why such examinations are as we think, deemed necessary are these:

We have one case of typhoid fever in the village and another suspicious case. We have two wells, the water of which we want analyzed and there is a surface drain running into a stream which forms a pond where ice is taken, and we wish three bottles for this; one at the outlet of this drain, one above and one below; another for a spring, one for a cistern and one for the village water supply.

Trusting this information is sufficient, I am,

Yours truly,

M. S. STRONG.

ALBANY, N. Y., *November* 19, 1904.

Mr. M. S. STRONG, *Secretary, Board of Health, Granville, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 18th inst., in explanation of your request for eight water bottles.

Six bottles have been sent to Dr. McKenzie as it is not considered necessary to make three examinations of the pond water, the suggestion being offered that one sample be taken from the pond, which will be sufficient to determine as to whether or not ice should be used from same for domestic purposes.

All specimens should be procured and forwarded by the health officer who will be expected to strictly follow the printed instructions contained in each package.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ALBANY, N. Y., *December* 3, 1904.

Dr. D. C. MCKENZIE, *Health Officer, Granville, N. Y.:*

Dear Sir:—I enclose herewith for your information, copy of a report made by Dr. R. M. Pearce upon his examination of five specimens of water received from you.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ALBANY, N. Y., *December* 2, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the five specimens of water received from Dr. C. McKenzie, health officer at Granville, N. Y. Specimens dated November 24th; received here November 25th; analyses started, November 28th.

Specimen No. 1—"Stream." Agar plates showed 2,000 organisms per cubic centimeter. Gelatin plates were partially liquefied, showed about 12,000 organisms per cubic centimeter. There was gas formation in four of the five fermentation tubes, in two of which it was almost exactly that of the bacillus coli. This water showing as it does very evident organic contamination cannot be considered safe for household purposes.

Specimen No. 2—"Spring." Agar plates showed 900 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate putrefactive odor, showed about 15,000 organisms per cubic centimeter. There was gas formation in all tubes, in one of which it was almost exactly that of the bacillus coli. This water shows a low bacterial count but there is evidence of organic contamination and it cannot be considered safe for household purposes. I would suggest the analysis of another specimen from this source.

Specimen No. 3—"Faucet." Agar plates showed 4,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong ammoniacal and putrefactive odor. There was gas in two fermentation tubes, in one of which it was almost exactly that of the bacillus coli. This water showing as it does very evident organic contamination should not be used for household purposes. I would suggest the analysis of another specimen from this source.

Specimen No. 4—"Well." Agar plates showed 100 organisms per cubic centimeter. Gelatin plates were partially liquefied with a moderate odor. There was no gas formation in any fermentation tube. This water shows no evidence of organic contamination and may be considered safe for household purposes.

Specimen No. 5—"Cistern." Agar plates showed 300 organisms per cubic centimeter. Gelatin plates were liquefied with a

strong ammoniacal and putrefactive odor. There was gas in only one tube, in which it was not that of the bacillus coli. This water shows no evidence of organic contamination and is passed.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *December* 20, 1904.

D. C. MCKENZIE, M. D., *Health Officer, Granville, N. Y.:*

Dear Sir:—I enclose herewith for your information, copy of a report made by Dr. R. M. Pearce upon his examination of specimens of water received from you.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ALBANY, N. Y., *December* 19, 1904.

Dr. DANIEL LEWIS, *Commissioner State Department of Health, City:*

Dear Sir:—Following is the report on the specimens of water received from Dr. D. C. McKenzie, health officer at Granville, N. Y. Specimens dated December 14th; received here December 15th; analyses started next day.

Specimen No. 1. "Well."—Agar plates showed 520 organisms per cubic centimeter. Gelatin plates showed 2,300 organisms per cubic centimeter. There was no gas formation in any fermentation tube. This water shows no evidence of organic contamination and a low bacterial count and may be considered safe for household purposes.

Specimen No. 2. "Stream." Surface drainage.—Agar plates showed 4,100 organisms per cubic centimeter. Gelatin plates showed 15,000 organisms per cubic centimeter. There was gas formation in all tubes, in one of which it was that of the colon bacillus. This water shows a rather high bacterial count and definite evidence of organic contamination and cannot be considered safe for household purposes.

Specimen No. 3. "Stream."—Agar plates showed 1,300 organisms per cubic centimeter. Gelatin plates showed 1,600

organisms per cubic centimeter. There was gas in three of the five fermentation tubes, in one of which it was almost exactly that of the colon bacillus. This water shows probable organic contamination and cannot be considered safe for household purposes.

Specimen No. 4 "Faucet."—Agar plates showed 680 organisms per cubic centimeter. Gelatin plates showed 2,000 organisms per cubic centimeter. There was gas in only one tube in which it was not of the colon bacillus type. This water shows no evidence of organic contamination and may be considered safe for household purposes.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *December* 23, 1904.

D. C. MCKENZIE, M. D., *Health Officer, Granville, N. Y.:*

Dear Sir.—I am in receipt of your communication of the 22nd instant in which you state that three specimens of ice cut from a stream near your village were recently analyzed at the Bender Laboratory and that the report on all is that it is not safe to use for household purposes. You further say that it has been the custom of the local dealer to cut ice from the polluted stream referred to and supply it to residents of Granville as well as those of the village of Middle Granville, such ice being used for domestic purposes.

In view of your statement of the facts in the case, it is advised that the boards of health of the villages of Granville and Middle Granville adopt resolutions prohibiting the cutting and offering for sale for domestic purposes, of ice cut from the stream in question, the waters of which have been found upon bacteriological tests to be so highly polluted as to make the ice from same unfit for household use.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

NEW YORK, *July* 16, 1904.

Hon. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Sir:—Under your instructions I examined on July 1 and 14, sundry cases of pollution of the headwaters of the Pascack river, from which the water supply of the Hackensack Water Company is derived. They are as follows:

A. Premises of Abram A. Demarest on Bardonia brook, in Clarkstown, N. Y. Residence is 100 feet from a pond formed by damming the brook. Water closet and laundry and kitchen wastes discharged through a six inch pipe into the pond above the water level. There is also a privy vault with a dry stone wall within 15 feet of the pond and above its level. The pit is in a filthy condition.

B. Premises of William Hyenga, in Clarkstown, near Spring Valley, on the Dutch Factory road. Privy about 70 feet from west branch of Pascack river, on the edge of the upland a few feet above flatlands cultivated as a garden, flooded in freshets, traversed by ditches into which the excrement from the privy slides down. Very nasty and objectionable in every way.

C. Button works of Mrs. Agnes Haerter on the Dutch Factory road. The waste from the factory discharges direct into the river. Water foul, but nothing particularly offensive to sight or smell.

IN THE VILLAGE OF SPRING VALLEY.

No. 36. Charles Young, Franklin street and Funston place. Barn yard with manure pile drainage directly into the stream in a swamp at the head of a pond. The surface water from the streets in the vicinity runs down each side of the barn and over part of the yard.

No. 124. Mrs. Dieterlin, Metropolitan avenue. Drainage and wash water from the residence conducted into swamp along course of stream, by tile pipe. On edge of swamp a chicken coop and yard. Water in swamp at outlet of drain filthy. Privy drains out over ground near swamp level.

Nos. 38, 123, 476. W. E. Gertner. Three houses, 15 to 30 feet from swamp formed by backwater from mill pond. Privies on edge of bank, discharging on surface of ground and running directly into the stream. Very filthy condition.

No. 104. Peter B. Lespinasse. Two cesspools on made ground three feet above the flat at edge of swamp. The flat is a dumping ground for tin scraps and rubbish.

No. 282. Peter Tallman. Privy with brick vault above ground on the flat adjoining swamp. In filthy condition. Adjoining this the drainage from a fruit store flows over the surface.

No. 290. Jefferson Youmans, Main street. Premises nicely kept and no offensive conditions. There is, however, a privy with a dry stone vault within 30 feet of the river on porous soil. On the rear of the property is a stable, the drainage from which leaches into a ditch in swampy land which is flooded in times of high water in the stream.

No. 467. Jacob Abrams, Main street. Two privies with dry stone vaults 25 feet from stream. On the bank of the stream are a pig pen and chicken coop and yard, the drainage of which is directly into the stream.

No. 475. John C. Wood. Privies and surface drainage from house directly into the swamp bordering the stream.

No. 26. F. D. Palmer. Drug store in which there is a water motor discharging into cesspool of rough boards and leaking into ditch which leads from No. 475 above noted. Dumping ground for rubbish on edge of swamp-land.

No. D. Public laundry at south end of village. J. D. Dunlap and Tallman, Central avenue opposite Smith street. Use about 100 cubic feet of water daily. The waste water, which is foul, of course, is discharged into a patch of swampy and wooded land, and what does not evaporate and soak away runs off through a culvert on Central avenue and down a ditch on South street, and into the stream. Some provision should be made for the purification of this waste water before its discharge into the stream.

The Hackensack Water Company express a desire to have immediate steps taken to remedy the above cited cases of pollution of the streams.

Respectfully submitted,

J. J. R. CROES,

Consulting Engineer.

Albany, N. Y., *July* 22, 1904.

Mr. W. Parker Smith, *President Board of Health, Village of Spring Valley, Spring Valley, N. Y.:*

Dear Sir:—Upon investigations made by this Department through its consulting engineer, Mr. J. J. R. Croes, it is found that the rules and regulations adopted for the protection from pollution of the public water supply of the village of Spring Valley supplied by the Hackensack and Pascack rivers and their tributaries located with the State of New York are being violated in the following cases:

(1.) Charles Young, Franklin street and Funston place. Barn yard with manure pile draining directly into the stream in a swamp at the head of a pond. The surface water from the streets in the vicinity runs down each side of the barn and over part of the yard.

(2.) Mrs. Dieterlin, Metropolitan avenue. Drainage and wash water from the residence conducted into a swamp along course of stream, by tile pipe. On edge of swamp a chicken coop and yard. Water in swamp at outlet of drain filthy. Privy drains out over ground near swamp level.

(3.) W. E. Gertner. Three houses, fifteen to thirty feet from swamp formed by back water from mill pond. Privies on edge of bank, discharging on surface of ground and running directly into the stream. Very filthy condition.

(4.) Peter B. Lespinasse. Two cesspools on made ground three feet above the flat at edge of swamp. The flat is a dumping ground for tin scraps and rubbish.

(5.) Peter Tallman. Privy with brick vault above ground on flat adjoining swamp. In filthy condition. Adjoining this the drainage from a fruit store flows over the surface.

(6.) Jefferson Youmans, Main street. Premises nicely kept and no offensive conditions. There is, however, a privy with a dry stone vault within thirty feet of the river on porous soil. On the rear of the property is a stable, the drainage from which leaches into a ditch in swampy land which is flooded in times of high water in the stream.

(7.) Jacob Abrams, Main street. Two privies with dry stone vaults twenty-five feet from stream. On the bank of the stream

are a pig pen and chicken coop and yard, the drainage from which is directly into the stream.

(8.) John C. Wood. Privies and surface drainage from house directly into the swamp bordering the stream.

(9.) F. D. Palmer. Drug store in which there is a water motor discharging into cesspool of rough boards and leaking into ditch which leads from John C. Wood's above noted. Dumping ground for rubbish on swampy land.

(10.) Public laundry at south end of village. J. D. Dunlop and Tallman, Central avenue, opposite Smith street. Use about 100 cubic feet of water daily. The waste water which is foul, of course, is discharged into a patch of swampy and wooded land and what does not evaporate and soak away runs off through a culvert on Central avenue and down a ditch on South street, and into the stream. Some provision should be made for the purification of this waste water before it discharges into the stream.

In view of the above report of facts and by virtue of the authority vested in me under section 71 of the Public Health Law, as amended by chapter 484 of the laws of 1904, I hereby order the board of health of the village of Spring Valley to convene and enforce obedience to the rules and regulations of this Department in the cases specified, the rules having been published and a copy of same filed in the office of the county clerk of Rockland county.

Very respectfully,

DANIEL LEWIS,

State Commissioner of Health.

ALBANY, N. Y., *July* 22, 1904.

MR. ALFRED V. H. CLARK, *President Board of Health, Town of Clarkstown, Nanuet, N. Y.:*

Dear Sir:—Upon investigations made by this Department through its consulting engineer, Mr. J. J. R. Croes, it is found that the rules and regulations adopted for the protection from pollution of the public water supply of the village of Spring Valley supplied by the Hackensack and Pascack rivers and their tributaries within the State of New York are being violated in the following cases:

(a.) Premises of Abram A. Demarest on Bardonia brook in Clarkstown, N. Y. Residence is 100 feet from a pond formed by damming the brook. Water closets and laundry and kitchen wastes discharge through a six-inch pipe into a pond above the water level. There is also a privy vault with a dry stone wall within fifteen feet of the pond and above its level. The pit is in a filthy condition.

(b.) Premises of Wm. Hyenga in Clarkstown, near Spring Valley, on the Dutch Factory road. Privy about seventy feet from west branch of Pascack river on the edge of the upland a few feet from flat lands cultivated as a garden, flooded in freshets, traversed by ditches into which the excrement from the privies slides down. Very nasty and objectionable in every way.

(c.) Button works of Mrs. Agnes Hearter on the Dutch Factory road. The waste from the factory discharges direct into the river. Water foul but nothing particularly offensive to sight or smell.

In view of the above report and by virtue of the authority vested in me under section 71 of the Public Health Law, as amended by chapter 484 of the laws of 1904, I hereby order the board of health of the town of Clarkstown to convene and enforce obedience to the rules and regulations of this Department in the cases specified, the rules having been published and a copy of same filed in the office of the county clerk of Rockland county.

Very respectfully,

DANIEL LEWIS,
State Commissioner of Health.

August 18, 1904.

Mr. J. J. R. CROES, *C. E., Morris Building,* 68 *Broad Street, New York City:*

Dear Sir:—Under date of July 22, 1904, we notified the Board of Health of the town of Clarkstown of violations of rules and regulations adopted by this Department for the protection from contamination of the public water supply of Spring Valley, as shown by your report of July 16, 1904.

The secretary of the Board of Health of the town of Clarkstown replied as follows:

"In reply to your communication of July 22d inst, the Board of Health of Clarkstown would call your attention to the first

paragraph in which you intimate that the waters used in Spring Valley, for potable purposes are polluted by three different sources, a, b and c, noted.

"This is not so, as all the premises complained of lie from one-half to three miles below Spring Valley, and none of its waters are used by the Spring Valley Water and Supply Co., which is practically the Hackensack Water Co. The Pascack creek does not join the Hackensack creek in the State of New York, but that (a) premises are situated upon the water supply of Nyack water supply, and that the pollution should be remedied and the board will at once notify Mr. Demarest to abate the nuisance. .

"And if your orders still remain the same after noting the inaccuracy of your premises, kindly notify us and it will be attended to at once."

Kindly advise me as to the alleged inaccuracy of our statement as to location, etc.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

NEW YORK, *August* 19, 1904.

Hon. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—In reply to your letter of August 18th, I beg to say that there appears to have been a misapprehension on your part, of the subject matter of my report of July 16th, with reference to the pollution of the headwaters of the Hackensack river.

The nuisances complained of and reported upon by me, do not affect the supply of the Spring Valley Water Company, but they do pollute the Hackensack river, the water of which is used by the Hackensack Water Company for domestic supply at several points in the state of New Jersey.

The village of Nyack takes its water from the Hackensack river below the nuisance *A* on Bardonia brook, so that it also is affected thereby, but the complaint in this case was made by the Hackensack Water Company.

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The accompanying map of the courses of the several streams will give you an idea of the relation to each other of the several localities mentioned.

Very respectfully, your obedient servant,

J. J. R. CROES,

Consulting Engineer.

ALBANY, N. Y., *November* 14, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Union College, Schenectady, N. Y.:*

Dear Sir:—You are requested to communicate with Mr. H. G. Darwin of the Hackensack Water Co., who desires to have you investigate as to alleged violations of rules and regulations made by this Department for the protection of the Hackensack watershed.

Mr. Darwin's address is 84 Clinton place, Hackensack, N. J. He will furnish you with a list of alleged violations.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

SCHENECTADY, N. Y., *December* 6, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I beg to report as follows on my recent inspection of the alleged violations of the rules enacted by this Department for the sanitary protection of the water supply of the Hackensack Water Co. lying within the State of New York.

My inspection was made on November 19th in company with Mr. H. G. Darwin, inspector of the Hackensack Water Co., who identified the cases as those on which formal notices had previously been served.

The alleged violations were as follows:

1. Owner, Mrs. Annie Demarest (non occupant); address, 1339 Bedford avenue, Brooklyn, N. Y.; premises, west side of Main street in unincorporated village of Nanuet, town of Clarkstown, Rockland county, N. Y.; item, privy with earth vault within the minimum prohibited distance from water-course. Notice served by water company on April 21, 1904, with several subsequent letters. Location within prohibited distance verified.

2. Joint owners, G. M. Etsell and H. M. Fisher (nonoccupants); address, Nanuet, N. Y.; premises, west side of Main street in unincorporated village of Nanuet, town of Clarkstown, Rockland county, N. Y.; item, privy with brick vault without removable receptacle within minimum prohibited distance from water-course. Formal notice served by water company on April 21, 1904. Location within prohibited distance verified.

3. Joint owners, G. M. Etsell and H. M. Fisher (nonoccupants); address, Nanuet, N. Y.; item, privy with timber vault without removable receptacle within minimum prohibited distance. Formal notice served by water company on April 21, 1904. Location within prohibited distance verified.

4. Joint owners, G. M. Etsell and H. M. Fisher, Nanuet, N. Y.; occupied by H. M. Fisher; premises, west side of Main street in unincorporated villags of Nanuet, town of Clarkstown, Rockland county, N. Y.; item, stable with manure pile within prohibited minimum distance from water-course. Formal notice served by water company on April 21, 1904.

5. Owner, J. J. Mitchell (nonoccupant); address, Nanuet, N. Y.; premises, west side of Main street in unincorporated village of Nanuet, town of Clarkstown, Rockland county, N. Y.; item, privy with earth vault within minimum prohibited distance. Formal notice served by water company on April 21, 1904, with subsequent notice on August 11, 1904. Privy was subsequently moved to a new site but still within minimum prohibited distance. Location within prohibited distance verified.

6. Same owner and premses; item, manure pile within minimum prohibited distance. Location within prohibited distance verified.

7. Same owner and premises; item, drain from house sink runs into adjacent water-course. Formal notice served by water company on April 21, 1904. Existence of violation verified.

8. Owner, Richard Cook; care of Mrs. Kate Mitchell, Nanuet, N. Y. (nonoccupant); premises, west side of Main street in unincorporated village of Nanuet, town of Clarkstown, Rockland county, N. Y.; item, privy within prohibited minimum distance from water-course. Formal notice served by water company on August 11, 1904. Location within prohibited distance verified.

9. Owner, William Hyenga, Spring Valley, N. Y.; premises, north side of Dutch Factory road near village of Spring Valley, but outside the village line and within the township of Clarkstown, Rockland county, N. Y.; item, privy without water-tight removable receptacle within prohibited distance of water-course. Formal notice served by water company on April 9, 1904. Location within prohibited distance verified.

10, 11. Owner, Mrs. Agnes Haerter, Spring Valley, N. Y.; premises, button factory on Dutch Factory road in town of Clarkstown, Rockland county, N. Y.; items, two privies at button factory having earth vaults within prohibited minimum distance. Formal notice served by water company on April 9, 1904.

12. Owner, Mrs. Agnes Haerter, Spring Valley, N. Y.; premises, tenement house, first east of button factory, town of Clarkstown, Rockland county, N. Y.; item, privy within minimum prohibited distance. Formal notice served by water company on April 9, 1904. Location within prohibited distance verified.

13. Owner, Mrs. Agnes Haerter, Spring Valley, N. Y.; premies, tenement house, first west of button factory on Dutch Factory road, town of Clarkstown, Rockland county, N. Y.; item, privy with movable receptacle, but not water-tight, nor maintained in proper condition, also located within minimum prohibited distance. Formal notice served by water company on April 9, 1904. Location within prohibited distance and defective condition verified.

14. Same owner and premises as above; item, house drain discharging into water-course. Formal notice served by water company on April 9, 1904. Existence of violation verified.

15. Same owner as above; premises, tenement-house in rear of premises No. 14; item, privy within prohibited minimum distance. Formal notice served by water company on April 9, 1904. Location within prohibited distance verified.

16. Owner, George Wood, Spring Valley, N. Y.; premises, tenement house, south side of Lawsen street, opposite Metropolitan avenue, village of Spring Valley, town of Clarkstown, Rockland county, N. Y.; item, privy with rough stone vault within prohibited distance. Formal notice served by water company on April 21, 1904. Owner has improperly complied with regu-

lation by building a masonry vault, but without means of cleaning or emptying. Location within prohibited distance verified.

17. Owner has complied with regulation.

18. Owner has complied with regulation.

19. Owner, T. F. Reed, Spring Valley, N. Y.; premises, tenement house east side of Main street, village of Spring Valley, town of Clarkstown, Rockland county, N. Y.; (Hoyt, tenant); item, privy within prohibited distance. Formal notice served by water company on April 13, 1904. Location within prohibited distance from water-course verified.

20. Same owner; premises, east side of Main street, village of Spring Valley, Rockland county, N. Y.; (Van Welden, tenant); item, privy within limiting distance. Formal notice served by water company on April 13, 1904. Location within prohibited distance from water-course verified.

21. Same owner; premises, east side of Main street, village of Spring Valley, Rockland county, N. Y.; (Samperson, tenant); item, stable with manure receptacle not properly arranged, and within prohibited distance. Formal notice served by water company on April 13, 1904. Position within prohibited distance from water-course verified.

22. Same owner; premises, east side of Main street, village of Spring Valley, Rockland county, N. Y.; item, privy within prohibited distance from water-course. Formal notice served by water company on April 13, 1904. Position within prohibited distance verified.

23. Same owner and premises; item, house drain empties on surface of ground within prohibited distance from water-course. Formal notice served by water company. Existence of violation verified.

24. Owner, Mitro Romanski, Spring Valley, N. Y.; premises, east side of Myrtle avenue, opposite Hoyt street, village of Spring Valley, Rockland county, N. Y.; item, privy with new stone vault within prohibited distance. Formal notice served by water company on April 7, 1904. Location within prohibited distance verified.

25. Owner, E. Van Zandt, Spring Valley, N. Y.; premises, east side of Myrtle avenue, south of Hoyt street, village of Spring Valley, Rockland county, N. Y.; item, privy within prohibited

distance from water-course. Formal notice served by water company on April 7, 1904. Location within prohibited distance verified.

26. Owner, Helena Axt, Spring Valley, N. Y.; premises, shirt waist factory, east side of Myrtle avenue, village of Spring Valley, Rockland county, N. Y.; items, two privies without receptacles and within prohibited distances from water-course. Formal notice served by water company on owner June 25th, on tenant, April 7, 1904. Location within prohibited distance verified.

27. Owner and occupant, George S. Downs, Spring Valley, N. Y.; premises, east side of Myrtle avenue, first house north of Church street, in village of Spring Valley, Rockland county, N. Y.; item, privy within prohibited distance from water-course. Formal notice served by water company on April 7, 1904. Location within prohibited distance verified.

Owner states privy was moved two years ago under directions from Hackensack Water Co.

28. Owner, John H. Van Orden, Spring Valley, N. Y.; premises, south side of Church street, east of Myrtle avenue; item, manure bin on ground which is regularly overflowed at high water. Formal notice served by water company on August 18, 1904. Prohibited location verified.

29. Owner, Elmer Van Orden, Spring Valley, N. Y.; premises, south side of Church street, east side of Myrtle avenue, adjoining premises 28; item, manure bin on ground regularly overflowed at high water. Formal notice served by water company on August 18, 1904. Prohibited location verified.

30. Owner, Randall A. Tollman, Spring Valley, N. Y.; premises, tenement house, west side of Johnson street next south of double tenement, village of Spring Valley, Rockland county, N. Y.; item, privy without receptacle within prohibited distance. Formal notice served by water company on August 18, 1904. Location within prohibited distance verified.

31. Same owner; premises adjoining and north of No. 30; item, privy without receptacle within prohibited distance from water-course. Formal notice served by water company on August 18, 1904. Location within prohibited distance verified.

While none of the above cases comply with the requirements of the rules duly enacted for the protection of the Hackensack

Water Company's water supply, there remains an important consideration which would appear to be a determining factor in the question as to whether these cases are in reality violations of the rule or not. This point is as follows:

Section 72 of the Public Health Law makes it quite clear that in cases where the enforcement of water rules would make necessary construction or change of a system of sewerage or the providing of some means of removal or purification of sewage or the removal of any building, no action or proceeding shall be taken against any person for the violation of such rule or regulation and such person shall not be considered to have violated or refused to obey any such rule or regulation until such changes or improvements are made by the municipality or corporation owning the water-works to be benefited thereby at its own expense. This stipulation is clearly in keeping with the constitutional provision against the taking of private property for public use without just compensation. Although section 72 of the Public Health Law fails to mention that the numerous other changes and requirements which may be necessary for compliance with the rules, must be made at the expense of the municipality or water company benefited, it would seem that this omission, whether intentional or an oversight would not be effective in depriving private owners of just compensation for the loss of their property or for any damage caused by the enforcement of the rules. The expense of making changes demanded by duly enacted rules would seem to belong clearly to the municipality or water company benefited unless the thing or the condition to be changed was a nuisance or was something to which the owner himself had no right.

If this view is correct it would have an important bearing on many of the above named cases. Although the Hackensack Water Company has complied with the law in the publication of the rules and the serving of notices on the individual owners of premises where alleged violations occur, they have not carried out the needed improvements at their own expense, nor have they made any tender of the cost of such improvements to the owners, nor have they indicated to the owners that the expense incurred by the changes nor any portion of such expense would be assumed by the water company. A large majority of the above named

alleged violations do not, in my opinion, constitute nuisances in themselves, apart from these particular water rules and under the circumstances it would appear to me that the owners of these particular alleged violations could not legally be held to be violators of the rules.

As this, however, is purely a legal question, and as it is one of great importance in the carrying out of the business of the Department in respect to verifying alleged violations, I beg to suggest that the opinion of the State Attorney-General be requested on this particular point. It may be proper to remind you that the larger and more important of the cities and water companies protected by the rules of this Department have adopted the view regarding their rights and the rights of owners which I have set forth above.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

Albany, N. Y., *December* 23, 1904.

Mr. H. G. Darwin, 84 *Clinton Place, Hackensack, N. J.:*

Dear Sir:—I enclose herewith copy of a report made by Prof. Olin H. Landreth, concerning his recent investigation as to alleged violation of rules and regulations enacted by this Department for the sanitary protection of the water supply of the Hackensack Water Company lying within the State of New York.

Your attention is particularly called to the exceptions taken by Professor Landreth as to the desirability of enforcing compliance with the rules, and before definite action is taken I would be pleased to hear from you on the subject.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

Albany, N. Y., *July* 18, 1904.

Mr. A. N. Graham, *Secretary Board of Health, Village of Hunter, Hunter N. Y.:*

Dear Sir:—I am in receipt of your communication of the 15th inst., stating that a dam or reservoir of the Greene County Water

Company from which water is taken for domestic use in the village and town of Hunter, is being used as a bathing place by a number of persons, and note your request to be advised what should be done in order to prevent such use of the water.

As you state that the reservoir is located outside of the village, I have communicated with the health officer of the town, Dr. Rudolph Bestle, and have requested him to recommend to the town board of health that it adopt a rule prohibiting bathing in the reservoir in question, the rule to carry a penalty of a fixed sum, which penalty should be enforced against those violating the rule.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

HUNTER, N. Y., *August* 6, 1904.

MR. DANIEL LEWIS, *Commissioner of Health, Albany, N. Y.:*

Dear Sir:—Yours of the 18th of July, relative to persons bathing in the dam of the Greene County Water Co., received.

The town board of health met and passed a resolution forbidding persons bathing in or polluting any source of supply, or the reservoirs, of any public water supply in the town of Hunter under a penalty of $50 for each offense.

Now, I want to know if this ordinance or rule has to be adopted and approved of by the State Board of Health, and if it must be published in our local newspaper in order to make it operative and legal. Please advise me fully, and oblige,

Yours truly,

A. N. GRAHAM,

Secretary Board of Health of Hunter Village.

ALBANY, N. Y., *August* 8, 1904.

MR. A. N GRAHAM, *Secretary Board of Health, Hunter, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 6th instant in the matter of the rules adopted by the board of health of the town of Hunter, prohibiting bathing in the reservoirs and streams furnishing the public water supply of the town and village of Hunter.

It is thought that printed notices of the action of the board posted near the reservoirs and along the streams, also in some conspicuous place in the town, say the Town Hall, for instance, would cover all the requirements of the law; still it would do no harm to have the rules inserted in one or more of the newspapers published in the town for a week or more.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *July* 28, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully inclose herewith report in duplicate on the analysis of a sample of water received by your order on the 20th instant, from Dr. A. C. Aldrich, health officer, Lyons, N. Y. Concerning this water, Dr. Aldrich writes: "This water is taken out of a creek, marshy in character and very muddy; is pumped into a well side of the creek; then into a standpipe and through village. It is claimed they pump it direct from creek and not filter it; well is a plugged salt well, I believe. Creek gets all surface washings from marshy lands."

The results of the analysis sustain the health officer in the opinion which he evidently entertains, since they indicate that the water is polluted and entirely unfit for domestic use. If within the authority of the health officer this supply should certainly be condemned.

Very respectfully yours,
W. G. TUCKER,
Director.

Analysis of Potable Water No. 801.

(Results are parts in 100,000.)

Received from Dr. A. C. Aldrich, health officer, Lyons, N. Y.; date received, July 20, 1904; source, village supply from marshy creek; how labeled, "Lyons, N. Y., water from hydrant supply;" appearance, color, deep greenish-yellow tint; turbidity, none; sediment, very slight; odor at 100 degrees Fahrenheit, very slight; chlorine in chlorides, 31.00; free ammonia, 0.0130; albuminoid

ammonia, 0.0285; nitrogen as nitrites, 0.0036; nitrogen as nitrates, 0.0716; total solids, 111.20; loss on ignition, 24.80; behavior during ignition, blackened and evolved some odor; mineral matter, 86.40; remarks, unfit for domestic use.

W. G. TUCKER,
Director.

Bureau of Chemistry, July 28, 1904.

ALBANY, N. Y., *August* 18, 1904.

M. A. VEEDER, M. D., *Health Officer, Lyons, N. Y.:*

Dear Sir:—In July last a sample of water received from Dr. Aldrich and taken from a hydrant in the village of Lyons was examined chemically in the laboratory of this Department, a copy of the report being herewith enclosed.

Concerning the water, Dr. Aldrich writes, "This water is taken out of a creek, marshy in character and very muddy; is pumped into a well side of creek; then into a standpipe and through village. It is claimed they pump it direct from creek and not filter it; well is a plugged salt well, I believe. Creek gets all surface washings from marshy land."

Prof. Tucker adds to his report as follows:

"The results of the analysis sustain the health officer in the opinion which he evidently entertains, since they indicate that the water is polluted and entirely unfit for domestic use."

I would be pleased to hear from you concerning the matter as from the report of Professor Tucker it would appear that the public water supply is such as to warrant immediate action on the part of the local authorities.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

LYONS, N. Y., *August* 20, 1904.

Mr. T. A. STUART, *State Department of Health, Albany, N. Y.:*

My Dear Sir:—In reply to yours of August 18th inclosing Professor Tucker's analysis of water sent him by Dr. Aldrich, I return an analysis purporting to be by Professor Lattimore of Rochester. The figures correspond very closely with those of Prof. Tucker, but the conclusion drawn is exactly opposite.

As a matter of fact it is difficult in the clay soil hereabouts to get water free from danger of surface contamination. The dozen or so wells put down by the water company yield water that is reasonably secure in this respect, but it is not enough in quantity and at times they have been compelled to supplement it from the creek. Very little of it is used for domestic purposes, and because of constant agitation of the subject persons so using it as a rule boil it before using. The company has never paid a dividend (in 18 years except one), on their investment of something like $50,000, I believe. As a matter of fact no case of typhoid has been traced to this water thus far, although careful watch has been kept for the first positive evidence of the sort. The company put down an artesian well and at 145 feet struck salt. The well was plugged and abandoned. No water came from it. We have maintained an attitude of anxious expectancy, the problem of good water in this locality being excessively difficult.

Yours very truly,
M. A. VEEDER.

P. S. Since writing the above I have seen the engineer of the pumping station and he declares positively that the emergency pipe into the creek has not been opened at all since a year ago last June when they built a filter bed of sand through which the water percolates *a distance of one hundred feet.* This pipe was certainly closed at this visit, which was wholly unexpected.

M. A. V.

ROCHESTER, N. Y., *August* 11, 1904.

LYONS WATER WORKS COMPANY, *Lyons, N. Y.:*

Gentlemen:—The following are the results of my analysis of the sample of water received from you on the 6th inst.:

The figures in the tabulated statement below indicate the parts by weight of the several substances contained in 100,000 parts of the water.

Residue on evaporation..............	112.02	111.20
Loss on ignition.....................	22.00	24.80
Fixed residue........................	90.02	86.40

Chlorine	32.50	31.00
Albuminoid ammonia	0.026	0.0285
Free ammonia	0.002	0.013
Nitrogen in nitrites	0.000	0.0036
Nitrogen in nitrates	0.000	0.0716

The analytical data given above furnish the following conclusions as to the sanitary quality of this water:

1. The quality of mineral matter held in solution—sixty-five grains in one gallon—is large and constitutes this a "hard water." It is composed chiefly of calcium carbonate with a little calcium sulphate and a still smaller proportion of magnesium salts. While these substances in such quantity have some importance in certain industrial applications, they are not considered important in the sanitary point of view.

2. Chlorine, as one of the constituents of sodium chloride, or common salt, is present in small quantities in most spring and well waters of the highest purity. House drainage always contains salt, and as this substance may be easily and certainly detected by chemical means, it serves the sanitarian as a valuable indication of the contamination of waters which have been exposed to access of drainage, as in the case of wells near dwelling houses and especially in populous villages. In localities where natural deposits of salts or saline springs exist or where the source of a water supply is remote from any possibility of sewage contamination, this indication has no sanitary significance.

3. Organic matter, in its various stages of decomposition, is indicated under the items of albuminoid ammonia, free ammonia, nitrites and nitrates. The small proportion of the first two and the entire absence of the last two show that this water is of satisfactory quality in this respect.

A memorandum accompanying this sample of water states that it was taken from W. H. Egan's tap in the presence of W. A. Hough, E. J. Smith and Franklin H. Miller, August 6, 1904.

Respectfully yours,

S. A. LATTIMORE.

ALBANY, N. Y., *June* 28, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the two specimens of water received from Dr. William Landt, health officer at Mohawk, N. Y. Specimens dated June 21st; received June 22d; analyses started next day.

Specimen No. 1.—"From dead end of water main." Agar plates showed 44,000 organisms per cubic centimetre. Gelatin plates were liquefied with an ammoniacal and putrefactive odor. There was gas formation in all fermentation tubes, in one of which it was almost positively that of the colon bacillus.

Specimen No. 2—"From well." Agar plates were too thickly seeded for accurate count; an estimated count gave 112,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong ammoniacal and putrefactive odor. There was gas formation in all fermentation tubes, in one of which it was definitely that of the colon bacillus.

Both of these waters showing as they do a very high bacterial count, contamination with putrefactive organisms and in one case an almost certain contamination with fecal material, are strongly condemned for household purposes without boiling.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *July* 8, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith reports in duplicate on the analysis of two samples of water from the village supply of Mohawk received by your order on June 30, 1904, from Dr. William Landt, Health Officer, Mohawk, N. Y. Dr. Landt, in a letter accompanying the samples and dated June 29, 1904, states that the source of the water is in a spring or well. Neither of the samples is of very satisfactory quality as judged by ordinary

standards for unpolluted spring waters. Both contain nitrites and in sample No. 781 they are suspiciously high. I am informed by the Bureau of Pathology that a bacteriological examination of these samples gives unsatisfactory results and, taking all the facts so far as known to me into consideration, I should advise that caution be observed in the use of this water, and that an examination be made with a view to determining the source of the pollution of the supply.

Very respectfully yours,

W. G. TUCKER,

Director.

Analysis of Potable Water No. 780.

(Results are parts in 100,000.)

Received from Dr. William Landt, Health Officer, Mohawk, N. Y. Date received, June 30, 1904; source, village supply from spring; how labelled, "No. 1;" appearance: color, light greenish tint; turbidity, none; sediment, trifling; odor at 100 degrees F., none; chlorine in chlorides, 0.60; free ammonia, 0.0075; albuminoid ammonia, 0.0085; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.1248; total solids, 27.20; loss on ignition, 4.40; behavior during ignition, no change; mineral matter, 22.80. Remarks: Nitrites present but low; ammonias high for spring water. Results not entirely satisfactory.

W. G. TUCKER,

Director.

Bureau of Chemistry, July 8, 1904.

Analysis of Potable Water No. 781.

(Results are parts in 100,000.)

Received from Dr. William Landt, Health Officer, Mohawk, N. Y. Date received, June 30, 1904; source, village supply, from end of main; how labelled, "No. 2;" appearance: color, greenish tint; turbidity, none; sediment, trifling; odor at 100 degrees F., slight; chlorine in chlorides, 0.60; free ammonia, 0.0005; albuminoid ammonia, 0.0050; nitrogen as nitrites, 0.0029; nitrogen as nitrates, 0.1536; total solids, 26.80; loss on ignition, 4.20; behavior during ignition, no change; mineral matter, 22.60.

Remarks: Nitrites present and much higher than in sample No. 780. Not satisfactory, although aside from nitrites the results are not indicative of decided pollution. See letter accompanying reports on this and preceding sample.

W. G. TUCKER,
Director.

Bureau of Chemistry, July 8, 1904.

ALBANY, N. Y., *July* 18, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady N. Y.:*

Dear Sir:—This Department has recently been making examinations of specimens of water received from the village of Mohawk and most of the specimens examined have given evidence of sewage pollution, in addition to which there have been a number of cases of typhoid fever, and the local authorities fearing that the use of the public water was the cause of the epidemic, they requested us to send a competent man to make a thorough examination respecting the water supply, etc.

We replied to Mr. Wm. Lamb, Secretary of the Board, to the effect that one of our consulting engineers would be detailed for the duty providing the municipality would guarantee the payment of his bill for services and expenses which we stated would in all probability not exceed the sum of fifty dollars, and we are in receipt of acknowledgment from Mr. Lamb in which he states that the village board has passed a resolution to defray the expenses of the consulting engineer on the terms stated in our letter of July 11th to Mr. Lamb.

I would be pleased to have you take up the investigation at Mohawk and would state that thirteen cases of typhoid have been reported to us from Mohawk from the first of June up to the present time.

Please notify Mr. Lamb as to the earliest date it will be possible for you to take up the investigation.

Very respectfully,

DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *July* 25, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—In connection with the investigation being carried on by you as to the water supply of the village of Mohawk as well as concerning the prevalence of typhoid fever in that village, you are authorized to use your judgment as to the scope of your investigation, and if you have reason to suspect that cases exist in either the town or village of Herkimer, I would be pleased in have you cover either or both of those places if the epidemic of typhoid at Mohawk is in any way connected with them.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ALBANY, N. Y., *July* 27, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the four specimens of water received from Prof. O. H. Landreth, Mohawk, N. Y. All specimens dated July 22d; received here July 25th; analyses started July 27th.

Specimen No. 1—"Mohawk Water Supply, Spring at Pump Station." Agar plates showed 2100 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate putrefactive odor. There was no gas in any fermentation tube.

Specimen No. 2—"Well pump." Agar plates showed 25,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong musty and putrefactive odor. There was gas formation in only two fermentation tubes, in neither of which was it of the colon type.

Specimen No. 3—"Miss Brown's dug-well." Agar plates showed 1,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong putrefactive and moderate ammoniacal odor. There was gas formation in three of the five fermentation tubes, in none of which was it of the colon type.

Specimen No. 4—from "Tap at home of Dr. William Landt." Agar plates showed 720 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate odor. There was gas forma-

tion in three fermentation tubes, in none of which was it of the colon type.

None of these waters show organic contamination and although the count is very high for good water in specimen No. 2 all are passed as safe for household use.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *August* 24, 1904.

WM. LANDT, M. D., *Health Officer, Mohawk, N. Y.:*

Dear Sir:—I enclose herewith for the information of the Board of Health of the village of Mohawk, a copy of the report of Professor Landreth, covering his recent investigation of cases of typhoid fever, also the subject of the public water supply of the village.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

SCHENECTADY, N. Y., *August* 20, 1904.

MR. T. A. STUART, *Acting State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—In the matter of the typhoid fever outbreak in the village of Mohawk, N. Y., which occurred in June of this year, and which was referred to me for investigation as to its origin particularly with reference to its having been due to the public water supply, I beg to report as follows:

On reaching Mohawk I found that the members of the village board of health, at whose instance the inquiry was made, were concerned only with the needed improvements in the public water supply, and were not concerned particularly in the cause of the outbreak. On my explaining, however, that no recommendations could be made as to improvements or protection of the public water supply until it was first ascertained whether the supply was subject to typhoid infection, the village authorities authorized the inquiry into the typhoid cause, and later authorized the examination of the water system with reference to its improvement.

TYPHOID FEVER OUTBREAK.

Mohawk is an incorporated village of about 2,100 population with a public water supply but no public sewer system nor many private sewers. The village has been free from typhoid since the summer of 1902, when there were two or three cases imported from outside. In June of this year an outbreak of the fever occurred which aggregated 18 cases, occurring and declining suddenly as indicated by the following dates of first call of physicians:

First call of physician.	No. of cases.
June 2d.	1
" 5th.	1
" 6th.	3
" 7th.	2
" 9th.	1
" 11th.	1
" 12th.	1
" 13th.	2
" 15th.	3
" 16th.	1
" 25th.	1
" 28th.	1
Total	18

The cases were almost all among quite young people, the ages running as follows: Years of age—6, 8, 11, 13, 17, 18, 18, 19, 20, 24, 26, 26, 28, 30, 32, 32, 58.

The cases were divided about equally between the two sexes, there being:

Among males	10 cases
Among females	8 cases

In prosecuting a systematic search for the source of the infection which led to the outbreak, it was found that all of the patients had been at Mohawk for most of the time during the twenty days immediately preceding their attack, though several of them had been in the neighboring villages on one or more occasions.

The cases were very uniformly scattered over the different parts of the village, precluding a strictly local cause for the fever.

All of the cases had before being taken ill used the regular village water, though, as stated above, three at least of the cases had used water in the village of Ilion and a few in Herkimer.

All of the cases had used milk from the same dairy owned by A——, who also distributed the milk to his customers by wagon.

On learning that all the cases had used the public water before being taken sick, and that also all had used milk from one dairy, an examination was commenced of the sources of water for the public supply and for possible causes of infection of the milk at the dairy in question.

The examination of the water system, which will be described in detail later, did not reveal any source of infection or in fact any event or change in the conditions surrounding the system which corresponded in time with the necessary date when infection should have occurred if the supply had been infected.

In the case of the milk from the dairy in question, it was learned that at the time the first cases of typhoid in Mohawk occurred a case also occurred at the home of A—— the owner of the dairy and milk route, whose residence is at his dairy. Learning this and also that several cases of typhoid fever had recently occurred in the village of Herkimer which is usually free from the disease, and ascertaining that milk from the dairy of A——was sold also in the village of Herkimer which adjoins the village of Mohawk, I extended the examination to Herkimer in order that further information bearing on the case might be secured.

At Herkimer it was learned from Dr. Kay, health officer for the village, that no typhoid had previously occurred since 1902. From him and the physicians having the cases in charge, the following information was secured: Eleven cases in all occurred up to July 29th, the date of my last inspection at Herkimer; these all occurred—with the exception of the case at the dairy of A——, between June 9th and July 7th and all but one of these cases, which was the third in one family and doubtless a secondary case, occurred between June 9th and 22d.

With one exception, concerning which further information is being secured, each of the Herkimer cases which followed the

case at the dairy of A—— drank milk from this dairy within the preceding twenty days, and in fact generally up to the time of being taken sick. One of the cases was a man who worked at the dairy of A——, but who was not taken ill until about June 12th. Another case was the sister of the case at the dairy of A——. This lady was not taken ill until about the middle of June.

My examination at the dairy in question developed the following information: About twenty cows were milked at the time of the beginning of the outbreak, which number was later increased to about thirty at the time of my inspection. The cows were milked in a barn situated about 100 feet from the house and about 60 or 70 feet from the milk station which was between the house and barn. Up to about the first of June, the beginning of the outbreak, the milking was done by A——, the owner of the dairy, assisted by the person who first contracted the fever and by the man who was taken ill about June 12th. From the barn the milk was carried directly to the milk station where it was strained directly from the milk pails into the milk cooler, where it was cooled by a circulating stream of water supplied from the Herkimer Public Water System. The water from the cooler was discharged into a large tank or trough at the milk station and the cloths used for straining the milk as well as the empty milk cans were washed at this station. As this station furnished ample running water, and a convenient platform, it was stated to me that the washing from the house was occasionally done at this platform or near it, and at the time of my inspection washing was being carried on by a servant quite near the platform, the water for which was being taken from the water tap at the trough.

The first case was taken ill with the fever and was seen by the physician for the first time on June 2d, and terminated fatally on July 22d. For several days prior to June 2d A—— states that this person had not aided in the milking owing to indisposition, but had continued to assist in household operations.

The foregoing circumstances would appear to offer an adequate and reasonably definite explanation of the source of the typhoid fever cases both in Mohawk and Herkimer. The infection from this source would appear to be not only possible but strongly probable and in the absence of evidence indicating that the infec-

tion came from another source the milk from the dairy of A—— may be accepted, tentatively at least, as constituting the source of infection.

MOHAWK PUBLIC WATER SUPPLY.

The Mohawk public water system comprises beside the system of street distribution mains, a pumping station operated by steam pumps, a pump well from which all the water from the system is taken, a spring basin which supplements the well supply by percolation into the well, and a stand pipe situated on a hill southeast of the village.

The system is owned by the village corporation and takes its supply from the above mentioned well and spring situated north of the Erie canal and south of the West Shore railroad at a point north of the western portion of the village of Mohawk. Referring to the Erie canal the pumping station together with the spring and well are situated about 250 feet north of Lock No. 42.

The pump well is formed by a shell of steel plates extending about 15 feet below the ordinary surface of the ground and into water-bearing material. The well is about 14 feet inside diameter and the steel shell is protected by an outer ring or curb of concrete extending some 10 or 12 feet below the ground surface. The spring basin is a shallow rectangular masonry tank 18 by 37 feet inside dimensions, with open gravel bottom and with an overflow pipe near the top of the wall and a discharge pipe which can be opened when desired a foot or so lower down. The spring basin is not connected with the well by piping, but the levels taken indicate a very direct connection between the two through the water-bearing strata, as the act of pumping from the well invariably lowers the water in the spring basin. When the pumps were not running the water in the well rose about three inches above the level of the outlet from the spring basin while the water was escaping from this outlet. Efforts to close this outlet and permit the water to come to a fixed level in the spring basin developed such extensive leaks under and through the basin walls that the water could be raised only four or five inches above the outlet. When the pumps are running at their normal rate the water is lowered in the well between six and seven feet and in the spring

basin about 13 inches. From the extensive series of levels taken on the water surfaces of the well and spring under different conditions and also on the surface of water in a set of twelve test-pits dug into the surface ground water stratum, it is clearly evident that the pump well and the spring have a direct underground water connection with one another and that the bodies of water which supply the well and spring are quite distinct and separate from the shallow sheet of surface ground-water which at the time of my examination varied from six inches to two feet below the surface of the ground in the vicinity of the pump station. The direction of the flow of this upper body of ground-water was toward the east and slightly north. While no test-pits were dug deep enough to reach the lower body of ground-water, certain facts stated to me regarding occurrences when the pump well was sunk indicate that this lower body of ground-water has a movement toward the northeast. If this supposition is correct, the water reaches the pump station after passing under the canal and under the northwestern corner of the village.

While the pump well and the spring which supplies the spring basin have a direct underground connection the waters apparently come from different and distinct sources, as indicated by the fact that the temperature of the two was different, also by the fact that the biological examination of samples taken July 22d and made at the Bender Laboratory showed the pump well water to contain more than ten times as many organisms per cubic centimeter as the water taken from the spring basin at a point where it enters through the bottom gravel.

Water from the Mohawk system was examined about June 30th both biologically and chemically by this Department. One sample was taken from the dead end of a water main in the eastern portion of the village and one sample was taken from a tap in the pump station and had evidently been recently pumped from the well. As stated above the water was also examined biologically by this Department on July 27th, one sample being taken from the pump well and one sample from the inflowing stream at the spring basin. The latter examinations indicate a much less unfavorable character to the water than the former and the two, taken together, indicate that the water is subject

to variation in quality. The very marked contrasts between the results of the later biological examination of the well water and spring water respectively, indicate the spring water to be of much better quality, and apparently very suitable and safe for use, since it is improbable that the spring water suffers the same variation in quality as does the ground-water from which the pump well draws its supply.

My inquiry did not extend into an examination of any other sources of water supply for the village than the present station, as I was not authorized to extend the inquiry in that direction, and I have no means of judging therefore whether any better source of supply is available or not. If the present station and general source of supply are to be continued, it would appear very desirable, from all the evidence thus far available, that the supply should be drawn only from the spring and none or no more than is necessary from the ground-water which now supplies the pump well. I am unable to form an opinion as to whether the flow from the spring apart from the other ground-water is adequate to supply the system or not, as the leaky condition of the basin walls did not permit of gauging the flow from the spring basin with the level raised to the height at which no well water flowed into the spring basin; viz, with the two at the same level and the pump not running. It would seem desirable that such a test should be arranged and made before any important changes are made which depend on the adequacy of spring water in supplying the system.

If it can be established that the spring flow apart from the well water is adequate to meet the village demands, it would then seem a very desirable and feasible improvement to construct a large water-tight reservoir or basin to receive the flow of the spring throughout the twenty-four hours of the day and to have the pumps take their supply directly from this storage basin. By this means the total daily flow of the spring could be secured instead of the flow during the six, eight or ten hours only during which the pumps are now operated.

The biological and chemical examinations of the well water supply indicate that this water is evidently polluted through surface sources; how far this pollution extends into the underground stream which forms the spring it is impossible to deter-

mine except relatively from the examinations of the two samples taken on July 22d. The number of organisms present in the spring water at that time was too high for spring water which does not receive surface pollution and suggests the probability that even the spring water is affected to some extent by surface impurities. In order to diminish this element as much as possible it is extremely desirable that in case the spring be improved so as to furnish the total supply as above suggested, a thorough cleaning up of the surface be executed for a considerable distance from the spring in each direction. The point most strikingly in need of such attention is a large cattle and horse barn and barn yard situated southeast from the spring, and while not in the direction of normal flow, it is not impossible that when the spring is drawn down by pumping, the direction of flow may be sufficiently reversed or modified to cause water to reach the spring through underground channels from the direction of the barn in question. A similar cleaning up should extend to the worst points at least to the south side of the canal immediately south and west from the station. It is hardly necessary to say that the station building and grounds should be placed and kept in such condition as to render pollution from the surface within this area impossible.

The reports of the several examinations of the Mohawk, referred in the above report are herewith enclosed with the request that they be forwarded to the health officer of Mohawk, Dr. William Landt.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

ALBANY, N. Y., *August* 2, 1904.

A. E. LEACH, M. D., *Health Officer, Mt. Morris, N. Y.:*

Dear Sir:—This Department is in receipt of a complaint concerning the quality of water being furnished to the residents of Mt. Morris by a private water company, it being claimed that several people have been made ill by reason of their having drank the water.

I have sent you two sterilized water bottles and suggest that you procure and forward specimens of the water for analyses.

Take the specimens in strict compliance with printed instructions which you will find with each bottle, and forward the specimens as directed.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *August* 12, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the two specimens of water received from Dr. A. E. Leach, Health Officer at Mt. Morris, N. Y. Specimens dated August 8th; received here August 10th; analyses started August 10th.

Specimen No. 1, "Reservoir."—Agar plates showed 3960 organisms per cubic centimeter. Gelatin plates were partially liquefied with a putrefactive odor. There was gas formation in only one fermentation tube, in which it was not of the colon type.

Specimen No. 2, "Faucet."—Agar plates showed 1610 organisms per cubic centimeter. Gelatin plates were partially liquefied with a putrefactive odor. There was gas formation in three tubes, in none of which was it of the colon type.

Neither of these waters shows organic contamination and are passed.

Respectfully submitted,
R. M. PEARCE,
Director.

TARRYTOWN, N. Y., *January* 30, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, Albany, N. Y.:*

Dear Sir:—The village of North Tarrytown is contemplating the municipal ownership of its water supply. The first step in this direction is a proposition for piping that village to be voted upon at the coming spring election.

Should they succeed in carrying the appropriation, for the near future they will connect on and take water from the Tarrytown system.

Those who oppose the proposition and who still desire to continue the service of the private company, The New York Consolidated Water Company, are repeatedly making statements derogatory to the quality and safety of our supply.

During the past two years I have personally made chemical and bacteriological examinations at least once each month, not only of the water which we supply, a filtered water, but also of all the small brooks tributary to our storage reservoir. The water of this storage reservoir being filtered is then pumped to our distributing reservoir.

These examinations are furnished to the physicians of both villages, also to the local board of health, and are on file and open to public inspection at the water office. Notwithstanding this fact the opponents of the proposition endeavor by innuendo and like methods to create doubt as to the sincerity of our purpose looking toward the protection of our supply.

I have suggested to the citizens' committee that they take a sample of the Tarrytown water and submit it to the State Board of Health for chemical analysis. They have directed me to ask you what the cost of the analysis will be, and advise me at an early date as possible.

I would say that Tarrytown has no especial interest in what the people of North Tarrytown do or say, except in a general way.

As to what we really are doing in Tarrytown in our endeavor to secure a safe water supply, I beg to refer you to Professor Landreth, who is quite familiar with our methods.

Yours very respectfully,
D. S. MERRITT.

ALBANY, N. Y., *February* 8, 1904.

MR. D. S. MERRITT, *Tarrytown, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 30th ult., referring to the possibility of the village of North Tarrytown taking its water supply from the Tarrytown system, and

note your statement as to certain opposition to such a course based upon the alleged impurity of the Tarrytown supply, specimens of which you desire to have analyzed by this Department.

In reply you are informed that under the circumstances we will be pleased to make the desired examinations and will send a representative to Tarrytown for the purpose of collecting the necessary samples.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *February* 29, 1904.

Mr. D. S. MERRITT, *Tarrytown, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 27th inst., enclosing a letter from Mr. Hyman Levy, President of the Board of Health of North Tarrytown, in which he requests that an inspection be made of the present water supply of that municipality as to safety and quality, also as to alleged nuisances along the line of the brook or river above the works.

In reply you are informed that I will be pleased to have Mr. Croes make such an inspection when he is investigating as to the Tarrytown water supply.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *March* 7, 1904.

Mr. J. JAMES R. CROES, *Consulting Engineer, State Department of Health, Morris Building,* 68 *Broad Street, New York City:*

Dear Sir:—In compliance with a request received from the Board of Water Commissioners of the village of Tarrytown, as well as one from Mr. Hyman Levy, President Board of Health of the village of North Tarrytown, it is advised that you proceed to both villages for the purpose of making a thorough investigation as to the public water supplies of the respective villages, the conditions of the water sheds as well as to the purity of the water. Water containers have been sent to Dr. D. S. Merritt, of Tarrytown, N. Y., that you may procure and forward specimens of water from both sources for chemical and bacteriological examinations.

Call upon Mr. Merritt, of Tarrytown, who is conversant with the subject and will explain fully to you the nature of the investigations to be made.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *April* 22, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the four specimens of water received from Mr. James R. Croes, of Tarrytown, N. Y., though Dr. Tucker. Specimens received April 7th; analyses started April 19th; finished this morning.

Specimen No. 1.—"Water from lower lake, entrance of Pocantra Hill Brook." Agar plates showed 130 organisms per cubic centimeter. Gelatin plates showed 4800 organisms; there was some liquefaction. There was gas formation in two fermentation tubes, in neither of which was it of the colon type.

Specimen No. 2.—"Water from lower lake, near outlet dam." Agar plates showed 230 organisms per cubic centimeter. Gelatin plates showed 3000 organisms per cubic centimeter; there was some liquefaction. There was gas in two fermentation tubes, in neither of which was it of the colon type.

Specimen No. 3.—"Water from lower lake, entrance of overflow from upper lake." Agar plates showed 230 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate ammoniacal and putrefactive odor. There was gas formation in all tubes, in none of which was it of the colon type.

Specimen No. 4.—"Water from pump." Agar plates showed 660 organisms per cubic centimeter. Gelatin plates showed 7700 organisms per cubic centimeter; they were moderately liquefied with a moderate odor. There was gas formation in two fermentation tubes, in neither of which was it of the colon type.

None of these waters show organic contamination and the bacterial count in all of them is low, therefore all are passed as safe waters.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *April* 22, 1904.

DR. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith reports in duplicate on the analysis of two samples of water received by your order on the 16th instant from J. J. R. Croes, C. E., and forwarded by him from Tarrytown, N. Y. No. 757 was marked "Water from lower lake," and No. 758, "Water from pump."

The waters are quite similar although that from the pump (No. 758) is the better. Their appearance is fairly satisfactory for surface waters; nitrites are absent; nitrates low; ammonias and oxygen absorbed are low in No. 758 and fairly low in 757 for surface waters. Total solids are low and they are soft waters.

While the water from the pump is superior to the other sample they neither of them show the presence of harmful pollution and, judged by our ordinarily accepted standards for waters of their class, they are of satisfactory quality and not to be condemned on chemical grounds.

I am informed by the Director of the Bureau of Bacteriology that he has examined these waters and finds them satisfactory.

Very respectfully yours,

W. G. TUCKER,

Director.

Analysis of Potable Water No. 758.

(Results are parts in 100,000.)

Received from J. J. R. Croes, C. E., from Tarrytown, N. Y. Date received, April 16, 1904; how labeled, "From Tarrytown. Water from pump;" appearance: color, greenish-yellow tint (lighter than No. 757); turbidity, slight (less than No. 757); sediment, trifling (less than No. 757); odor at 100 degrees F., none; chlorine in chlorides, 0.40; free ammonia, 0.0025; albuminoid ammonia, 0.0075; nitrogen as nitrites, 0.0000; nitrogen as nitrites, 0.0176; oxygen absorbed from permanganate, 0.1415; total solids 3.40; loss on ignition, 1.80; behavior during ignition, blackened; mineral matter, 1.60; total hardness, 2.73; hardness equivalent to grains carbonate lime per U. S. gallon, 1.59. For opinion, see accompanying letter.

W. G. TUCKER,

Bureau of Chemistry, April 22, 1904. *Director.*

Analysis of Potable Water No. 757.

(Results are parts in 100,000.)

Received from J. J. R. Croes, C. E., from Tarrytown, N. Y. Date received, April 16, 1904; how labeled, "From Tarrytown. Water from lower lake;" appearance: color, greenish-yellow tint; turbidity, distinct; sediment, very slight; odor at 100 degrees F., very slight; chlorine in chlorides, 0.40; free ammonia, 0.0045; albuminoid ammonia, 0.0185; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0172; oxygen absorbed from permanganate, 0.2215; total solids, 4.20; loss on ignition, 2.40; behavior during ignition, blackened; mineral matter, 1.80; total hardness, 2.86; hardness equivalent to grains carbonate lime per U. S. gallon, 1.67. For opinion, see accompanying letter.

W. G. TUCKER,
Bureau of Chemistry, April 22, 1904. *Director.*

NEW YORK, *May* 19, 1904.

HON. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—In compliance with your instructions of March 7th, I have examined the conditions existing on the watershed from which the supply of water for the village of Tarrytown is drawn and which may also be utilized for the supply of North Tarrytown.

There are other sources of supply available which I have not been able to thoroughly examine as yet. Such examinations are now in progress, but I consider it desirable that prompt action should be taken with reference to the present Tarrytown supply without waiting for the completion of the examination of the other sources.

The Tarrytown water supply is derived from an area of about 800 acres which drains into the Sawmill river and which lies partly within the village limits. Most of this area is unimproved woodland, but on the southern and western slopes, there are a number of residences and there are two stations of the New York and Putnam Railroad, adjoining which there are small clusters of houses. There are numerous springs on the hillsides and the water from them and the rainwater from the surface form a stream of variable flow which is impounded by a dam near East

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View station, forming a storage reservoir of about seventy acres area, which according to the observations of Mr. D. S. Merritt, the engineer and superintendent of the works, is capable of furnishing a constant supply of about one million gallons a day. At the dam there is a steam pumping station from which the water is supplied to two districts, high and low service.

Examination of the vicinity of all the residences on the watershed shows that the regulations for the preservation of the waters from pollution, which were established by the Water Commissioners with the approval of your Department, appear to be reasonably well maintained and the analyses of the water in the reservoir and at the pumps, made by the chemist and bacteriologist of your Department, show it to be a good, soft, wholesome water. I am of the opinion however that the attention of the water commissioners and the local board of health should be called to the necessity for a constant and careful enforcement of the regulations of the Board, particularly along the western slopes of the streams flowing into the upper part of the reservoir and at Pocantico Hills Station.

It appears that at some seasons of the year or conditions of the water an excessive growth of algae occurs in this water, producing offensive taste and odor. This is likely to occur in all surface waters and while unpleasant, is not necessarily unwholesome.

The present Tarrytown supply is not therefore such as would be selected for the construction of new works for a growing population. It is however capable of being rendered sufficient and wholesome for the use of the village inhabitants for several years, with a moderate outlay for the preservation of the purity of the water. I am of the opinion that this can be effectually accomplished by the installation of a mechanical filter plant at the pumping station, in conjunction with the enforcement of sanitary regulations on the watershed. Estimates which have been prepared by Mr. D. S. Merritt, the engineer of the water commissioners, show that such a plant can be installed for approximately $30,000, and I would recommend that the water commissioners be advised that it is important for the preservation of the public health that the construction of such a plant should be begun at as early a day as practicable.

With such addition, I think that the present source and mode of supply will be sufficient and satisfactory for the village of Tarrytown for several years.

Respectfully submitted,

J. JAMES R. CROES,

Consulting Engineers.

ALBANY, N. Y., *May* 24, 1904.

The President of the Board of Water Commissioners, Tarrytown, N. Y.:

Dear Sir:—I enclose herewith for your information, a copy of a report made to me by Mr. J. J. R. Croes, C. E., a consulting engineer of this Department, covering his investigation concerning the watershed and water supply of the village of Tarrytown.

In view of the conclusions of Mr. Croes, I recommend that the rules and regulations adopted by this Department for the protection from pollution of the public water supply of the village of Tarrytown be rigidly enforced, particularly along the westerly slopes of the streams flowing into the upper part of the reservoir at Pocantico Hill Station.

Mr. Croes' suggestions as to the construction of a mechanical filter at the pumping station meets with my approval and I would recommend that the matter of its construction receive your prompt and favorable consideration.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ROME, N. Y., *February* 17, 1904.

State Department of Health, Albany, N. Y.:

Gentlemen:—Kindly send our sample of Rome city water, sent to you by express to-day, to your chemist. I would like to have a bacteriological examination, etc.

Yours respectfully,

H. C. SUTTON.

ALBANY, N. Y., *February* 23, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on a specimen of water received from Dr. Sutton, health officer at Rome, N. Y. Received in frozen condition February 19th; analysis same day.

There was gas in only one fermentation tube, in this it was of the colon type. Agar plates showed 340 organisms per cubic centimeter. Gelatin plates showed 6,000 organisms per cubic centimeter. These plates have a strong ammoniacal and putrefactive odor; were partially liquefied.

This water is condemned on the basis of colon contamination though the bacterial count is low.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *March* 28, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the two specimens of water received from Dr. H. C. Sutton, Health Officer at Rome, N. Y.

Specimen No. 1.—Received March 22; analysis started next day. There is no gas in any of the fermentation tubes. Agar plates showed 50 organisms per cubic centimeter. Gelatin plates showed a very high bacterial content, the plates being too thickly seeded for counting. However as this water shows no evidence of organic contamination it is passed as safe water.

Specimen No. 2.—Received March 24; analysis started next day. Agar plates showed 240 organisms per cubic centimeter. Gelatin plates showed 11,000 organisms per cubic centimeter. There was gas in three of the fermentation tubes, in none of which was it of the colon type. This water is also passed.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *June* 7, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. H. C. Sutton, Health Officer, at Rome, N. Y. Specimen dated May 31st; received here June 3d; analysis started next day.

Specimen from "Fountain, City Hall." Agar plates showed 150 organisms per cubic centimeter. Gelatin plates were liquefied with an ammoniacal and putrefactive odor. There was gas formation in four fermentation tubes, in none of which was it of the colon type.

This water is passed.

Respectfully submitted,
R. M. PEARCE,
Director.

ROME, N. Y., *October* 3, 1904.

DANIEL LEWIS, *Commissioner, Albany, N. Y.:*

Dear Sir:—At a meeting of the Board of Water and Sewer Commissioners of the City of Rome, N. Y., held September 30, 1904, the following report from Inspector R. B. Nisbet, was read and ordered placed on file, and a copy submitted to your Board:

ROME, N. Y., *September* 19, 1904.

To the Honorable Mayor and Members of the Board of Water and Sewer Commissioners, Rome, N. Y.:

I hereby submit to you a report of my inspection of the watershed of the public water supply of the city of Rome, N. Y.

On September 5th and 6th, 1904, I served a legal notice on the following persons to forthwith abate the nuisances on their premises, which were contaminating the water, and are in violation of the rules and regulations for the protection from contamination of the water supply of the city of Rome, N. Y.:

Mrs. David French, Westernville, N. Y., pig sty near stream which flows into Mohawk river.

Menzo Mowers, Westernville, N. Y., pig sty near stream which flows into Mohawk river.

Ellsworth Franklin, North Western, N. Y., drainage from whey vat and cheese factory, which runs into Mohawk river.

Ardin Paddock, North Western, N. Y., large manure pile which drains into Mohawk river.

Daniel Kelly, Dunn Brook, N. Y., manure pile near Black River canal.

Eugene Young, Boonville, N. Y., pig sty on bank of Black River canal.

And also on the following officials of the village of Boonville, N. Y., to cease draining the school sewer and all other sewers into the Black River canal:

Lincoln Perry, president of the village.

Dr. W. C. Roser, health officer of the town.

F. M. Wooley, supervisor of the town.

Garry A. Willard, president of the board of education.

On September 15th and 16th I made another inspection and found that the officials of Boonville, Ellsworth Franklin, of North Western, N. Y., and Ardin Paddock, of North Western, N. Y., had taken no steps to comply with the notices, but all other persons on whom I served notice have taken steps to abate the nuisances, and in some cases have removed their buildings.

Respectfully submitted,

R. B. NISBET,

Inspector.

This board now pray your honorable body to cause the within persons, whose names appear in this report, having been served with legal notices, and the nuisances not having been removed, would ask that legal steps be now taken by your Board to cause same to be done.

Yours respectfully,

C. T. HAYDEN,

Superintendent.

ALBANY, N. Y., *October* 6, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I enclose herewith copy of a report made by R. B. Nisbet, inspector of the Rome City Water Works, concerning

alleged nuisances on the watershed of the public water supply of the city of Rome, in violation of rules and regulations adopted by this Department.

Kindly investigate the cases at your earliest convenience and submit your report upon same.

Among the alleged nuisances is that of the discharge of sewage from the Boonville High School into the Black river canal.

I have promised the Hon. Garry A. Willard, President Board of Education at Boonville, that you would call upon him that he may be given an opportunity to explain certain facts in connection with the High School sewer.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

SCHENECTADY, N. Y., *October* 24, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—On October 6th you submitted to me a statement of three complaints of violations of the rules and regulations for the sanitary protection of the water supply of the city of Rome, N. Y., which complaints have been submitted to the Department in accordance with section 71 of the Public Health Law.

One of the three violations complained of was alleged to be the discharge of sewage from the Boonville High School sewer and from other sewers in that village into the Black river canal. Concerning this complaint it should be explained that the rules in question prohibit the discharge of sewage into that portion of the Black River canal which lies south of the point where the Forestport feeder enters the canal. As water on the south side of this point only enters the Rome water supply, the waters of the canal lying north of the mouth of the Forestport feeder flow northerly since the Boonville level is the summit level of the canal and the water entering it from the Forestport feeder divides at the mouth of the feeder, one part flowing northerly and the other southerly. The High School sewer in the village of Boonville was constructed subsequent to the enactment of the rules and was built so as to discharge, not directly into the canal, but into

an existing sewer or drain which discharged into the canal at a point south of the mouth of the Forestport feeder and thus entered the canal in that portion prohibited by the Rome water rules.

On October 21st I visited Rome for the purpose of ascertaining whether the complaint was correct or not and found that so far as relates to the school sewer and the other sewers discharged through the same sewer outlet the complaint is verified and is found to be true. So far as relates to the other sewers referred to in the complaint it is quite evident that the designation is too indefinite to admit of verification. It is undoubtedly the case that other sewers from the village of Boonville enter the canal, but a more definite description of them than is given in the complaints would evidently be necessary before any legal procedure could be taken toward the abatement of the violation. So far, however, as relates to the complaint of the High School sewer and the other sewers which unite with it and discharge into the canal through the same outlet I have to report that the complaint is verified.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

SCHENECTADY, N. Y., *October* 24, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—In the matter of the alleged violation of the rules for the protection of the water supply of the city of Rome, N. Y., by the discharge of sewage into the Black river canal through a sewer outlet which receives the sewage from the Boonville High School and from other buildings in that village, which alleged violation I have found to be verified, and on which I have just reported, I beg to write you more fully.

Agreeable to a suggestion in your letter of October 6th referring the matter to me for investigation, I called on Hon. Garry A. Willard, President of the Board of Education of Boonville, and also met with him Mr. Lincoln Perry, President of the village of Boonville. Both these gentlemen, while admitting that no steps

had been taken by them or by any village officer to discontinue the discharge of sewage into the Black river canal through the school sewer, directed their conversation to arguments showing: (1) that the sewage entering the canal from this sewer had no appreciable effect on the purity of the Rome water supply, and (2) that the condition of sewerage in the village of Boonville was in a satisfactory state and did not call for material change. While neither of these claims,—even if correct, which I do not admit,—has any bearing whatever on the strictly legal procedure to be followed in enforcing the Rome rules, I endeavored to present to the two officials mentioned the desirability of the village complying with the rules by such a remodeling or extension of its sewer system as should not only meet the requirements of the Rome rules, but which should also meet the requirements of the Watertown rules, which equally prohibit the discharge of sewage at Boonville, either directly into a tributary of Black river or indirectly into that portion of the Black river canal which lies north of the mouth of the Forestport feeder.

The conditions regarding the sewerage of Boonville are substantially as follows:

Many years ago the inhabitants of the village commenced to lead their sewers and drains into the several small water-courses which flow through the village. As the density of population increased and as the condition of these small streams became objectionable they were in places covered over. Some of these covered drains constituting sewers have been replaced by pipe sewers; others remain in their original crude condition; other citizens and the village corporation, and still others by the village many of them by private effort, some by joint effort of private corporation alone.

The village has never had any systematic sewer system adopted for it and so for as I can ascertain has no complete and accurate map of its existing sewers. Neither has the village complied with the requirements of chapter 468 of the laws of 1903 as regards the filing of a sewer report. It would appear therefore that under section 79 of the Public Health Law these sewers are being illegally maintained and that the village is moreover liable under section 79d for a penalty for the discharge of sewage from a sewer system without filing a report of the same. If the position

be taken that this is not a public sewer system but a collection of private sewers, then the sewers in question would fall under the category of those provided for in the last paragraph of section 79d for each of which the specified penalty is twenty-five ($25.00) dollars and five ($5.00) dollars per day for each day the offense is maintained.

During that portion of the year when the Black River canal is not maintained the entire drainage of the village, instead of being divided, a part flowing north into the Black river and a part flowing south into the Black River canal and the Mohawk river, is all carried to the north into a tributary of Black river directly, since Boonville lies on the Black river side of the water-shed line between the Black river and the Mohawk river. It results therefore that during the canal season the sewage of Boonville in part enters the Watertown water supply and in part enters the Rome water supply, but that during the time when the water is withdrawn from the canal the village sewage is all tributary to the Watertown water supply.

Many of the sewers and drains in the village were built and were in use prior to the dates when the rules for the protection of the Watertown and the Rome water supplies were enacted. So far as relates to these sewers it would seem that under section 72 the two municipalities whose water supplies were benefited by their sets of rules should at their expense construct and maintain as much of a sewer system and sewage disposal works at Boonville as would be necessary to enable that village to comply with the water rules in question. So far, however, as relates to sewers built since the date of the enactment of the sets of water rules for the protection of the Waterown and the Rome water supplies there would seem to be doubt at least as to the validity of any claim which the village might have on the two cities for aid in the construction of a sewer system or disposal works to enable the village to comply with the water rules.

If these interpretations are correct it would appear that Boonville is legally under obligation to abate the discharge of sewage from certain sewers and drains without aid from the two cities above mentioned, but that as regards other sewers and drains, namely those built prior to the enactment of the two sets of rules, it need not comply with the water rules prohibiting the discharge

of sewage from these sewers until the cost of such compliance shall have been provided for by the two cities whose water supplies are benefited.

In view of this condition of mixed liability I recommend informally to the village officials above mentioned; (1) that the village procure plans for a modern up-to-date sewer system and sewage disposal works with estimates of cost of the two systems respectively, the plans utilizing as far as possible the existing sewers in the village; (2) that when such plans have been prepared and approved by the State Department of Health, negotiations be opened with the proper officials of the cities of Watertown and Rome respectively to determine what proportion of the total cost of the above systems the three several municipalities should bear, and to adopt a plan of procedure which would cover the financing and the execution of the improvements, and (3) that the systems of sewerage and sewage disposal thus provided for be constructed.

I am writing this supplementary report both to advise you of the local situation at Boonville and to urge you, if you concur in my conclusions as to the best procedure to follow, that you write the proper officials of the village urging them to take the above or any other suitable procedure which may seem to you most effective in reaching an early adjustment of the undesirable situation now existing at Boonville.

Should the village take prompt and energetic steps toward the rectification of present sewerage conditions at Boonville, I should recommend that, as regards the law requiring a report of the sewer system as it existed at the time when the law went into effect May 6, 1903, the village be granted an extension of time to a specific date in the near future prior to which date it may submit its report and plan of the existing sewers. It might even be best, if adequate authority exists therefor, and if the village authorities apply for such privilege, that you fix a definite future date at which the complete plans for a modern system of sewerage and sewage disposal, shall be submitted, which plans shall in this case show by distinctive symbols all of the sewers as they existed on May 6, 1903, and that this be accepted in lieu of a separate and distinct map of the sewers as they existed on May 6, 1903.

Should, however, the village fail to take definite and satisfactory steps toward the above results, within a short, specific period to be prescribed by you, I beg to recommend that the proper steps be taken by the Department to enforce a prompt compliance with the law requiring a report and plan to be filed of the sewers as they existed on May 6, 1903, and in default of this compliance that the law providing a penalty for noncompliance be enforced. I see no good reason why Boonville should be permitted longer to successfully evade the plain requirements of the law as set forth in the several sections of chapter 468 of 1903. The village can claim neither impossibility of compliance nor ignorance of the terms of the law, since in addition to the notice by publication, two separate and distinct communications have been made the proper village officials calling their attention to the law and furnishing blanks for compliance.

In order that the village may properly present its claims for aid from the cities of Rome and Watertown respectively, if my recommendations above are carried out, it is desirable if not essential that a map shall be prepared showing the three following groups of sewers in Boonville: (1) All those sewers and drains which were built prior to the enactment of the Watertown rules on February 28, 1896; (2) all those sewers and drains which were built subsequent to February 28, 1896 and prior to the date of the enactment of the Rome water rules on November 16, 1899; and (3) all those sewers and drains which have been built subsequent to the last-named date of November 16, 1899.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

ALBANY, N. Y., *August* 20, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following are the reports on two specimens of water received from Dr. L. O. White, Sharon Springs, N. Y. Specimens dated August 15th; received at this laboratory, August 16th; analyses started the same day.

Source—"Faucet." Agar plates showed 270 organisms per cubic centimeters. Gelatin plates were partially liquefied with a slight putrefactive odor. There was gas formation in one tube, but in this it was not of the colon type. This water is passed.

Specimen No. 2 from "Reservoir" was spilled in transfer, owing to a broken bottle.

Respectfully submitted,

R. M. PEARCE,
Director.

ALBANY, N. Y., *September* 3, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. L. O. White, Health Officer of Sharon Springs, N. Y. Specimen dated August 31st, 5 p. m.; received here September 1st; analysis started the same day; completed September 3rd.

Source—"Reservoir." Agar count showed 6000 colonies per cubic centimeter. There was a trace of gas in three tubes. Gelatin, liquification of plates ;moderate ammonical odor.

This water shows no evidence of organic contamination, and is duly passed.

Respectfully submitted,

R. M. PEARCE,
Director.

ALBANY, N. Y., *June* 10, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I enclose herewith, plans and specifications of the Pittsburg Filter Co. for a filter plant to be constructed for the Sidney Water Works Co.

Kindly examine the plans and specifications and report upon same with such suggestions as you may deem necessary in the case.

Please return all papers with your report.

Very respectfully,

DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *June* 18, 1904.

Mr. W. E. BARKER, *Secretary Sidney Water Works Co., Sidney, N. Y.:*

Dear Sir:—I return herewith, the plans and specifications of a proposed filter plant for the Sidney Water Works Co., and call your attention to the report upon same made by Prof. Olin H. Landreth, one of the consulting engineers of this Department.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

SCHENECTADY, N. Y., *June* 13, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—In the matter of the plans and specifications for a mechanical filter proposed to be built for the Sidney Water Company by the Pittsburg Filter Company, I beg to say that I have looked over the plans and have to report them as follows:

The plans submitted comprise the following: (1) a proposal with general specifications submitted by the Pittsburg Filter Mfg. Co. to the Sidney Water Co., dated May 9, 1904; (2) a vertical sectional view of one of the two filters proposed; (3) an elevation drawing of the two filters with piping connections, dated February 23, 1904.

My examination of these plans leads me to the following conclusions:

1. From the experience with filters of this class there is little ground to expect that these filters would purify the stated 300,000 gallons of water per day to the degree of purification stipulated, continuously under service conditions.

2. The Filter Company, however, should be the best judge as to what it can safely propose and if it can submit a proposal based on proper specifications, its proposition should receive careful consideration and definite action.

3. The plans and specifications submitted fail to provide specifically for many points necessary to secure to the water company a filter plant that shall be of proper construction and efficient and satisfactory in operation and maintenance. These omitted points relate not only to more definite stipulations as to the degree of

purification to be reached in regard to suspended matter, matter in solution, bacteria, and methods and conditions under which these degrees of purification shall be tested and ascertained, but they also relate to fuller and more definite specifications covering materials and workmanship of the plant proposed, and a fuller statement as to what the proposal includes as regards foundations, connections with the Water Company's mains, painting and coatings, filter house, etc.

4. If the Sidney Water Company desires to secure a filter plant that would accomplish the necessary degree of purification at the lowest cost consistent with satisfactory operation and durability it would seem that this result could best be secured by having the water company prepare a set of general specifications closely stipulating the purification results to be attained and the means for testing and verifying the same and also general specifications as to the materials, workmanship, general conditions, etc., leaving the manufacturers of the different filters to submit their own designs accompanied by explicit specifications as to what they propose to furnish.

5. If this proposed filter is to operate on Guilford creek water it will be essential in order to secure a water safe for domestic use that the filtration plant be one not only of high efficiency, but one that shall be certain, regular and permanent in action.

The plans and specifications submitted are herewith respectfully returned to you.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

ALBANY, N. Y., *June* 23, 1904.

Mr. W. E. BARKER, *Secretary Sidney Water Works Co., Sidney, N. Y.*

Dear Sir:—I am in receipt of your communication of the 22nd inst., acknowledging receipt of a copy of Professor Landreth's report on the plans and specifications of a proposed filter plant, and note your request to be advised whether this Department would prepare specifications for you.

In reply you are informed that the Sidney Water Works Co., being a private corporation and about to install a mechanical filter, should employ a competent person to draw up suitable specifications for the work, also plans for same, and if presented to this Department by the Water Works Company, we will be pleased to examine and report upon same.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ALBANY, N. Y., *August* 9, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the two specimens of water received from Dr. J. V. E. Winnie, Health Officer at Sidney, N. Y. Both specimens dated August 1; received here August 2; analyses started August 2. Both specimens from same source and taken at same time.

Specimen No. 1—"Faucet." Agar plates showed 7460 organisms per cubic centimeter. Gelatin plates were partially liquefied with a mild putrefactive odor. There was gas formation in all tubes, in one of which it was of the colon type.

Specimen No. 2—"Faucet." Agar plates showed 1795 organisms per cubic centimeter. Gelatin plates were liquefied with an ammoniacal and putrefactive odor. There was gas formation in all fermentation tubes, in none of which was it of the colon type.

While this water is not entirely satisfactory, there is no distinct evidence of organic contamination.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *August* 16, 1904.

DR. DANIEL LEWIS, *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the two specimens of water received from Dr. W. G. Tucker from Sidney, N. Y. Speci-

mens were collected August 10; received August 11; analyses started upon day of receipt at this Laboratory.

Specimen No. 1—"Faucet in Filter House." Agar plates showed 19000 organisms per cubic centimeter. Gelatin plates were partially liquefied with a putrefactive odor, showed about 10000 organisms per cubic centimeter. There was gas formation in all tubes, in one of which it was of the proportion characterized by the colon bacillus.

Specimen No. 2—"Guilford Creek Reservoir." Agar plates showed 12000 organisms per cubic centimeter. Gelatin plates were partially liquefied with a slight putrefactive odor, showed about 8000 organisms per cubic centimeter. There was gas formation in all tubes, but in none of which did it at all approach the proportion of that of the colon bacillus.

Both of these waters show a moderately high bacterial count, particularly specimen No. 1, and as this specimen of water also shows probable organic contamination it cannot be regarded as satisfactory water. Specimen No. 2 is considered satisfactory and safe.

These findings are rather surprising as apparently they are originally from the same source, the worse specimen of the two is presumably the filtered water. It is sugested that another specimen from the filter house be sent for examination. Dr. Tucker has been consulted with before this report has been rendered.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *August* 16, 1904.

DR. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith reports in duplicate on the analysis of two samples of water from the public supply of Sidney, N. Y., taken by myself on the 10th instant. In conformity with your instructions I visited Sidney on that date and made such investigation of the water supply as time and circumstances would permit. Water is supplied to the village by the

Sidney Water Works Company and from two sources, as I am informed. One is obtained from streams in the hills about two miles southeast of the village and delivered through pipes by gravity. Of this source of supply I made no inspection, but this water is said to have given satisfaction. The other supply is derived from a reservoir formed by damming the Guilford creek some three miles or thereabouts from the village and in a northerly direction. This water is also supplied through pipes by gravity, and I am informed that the arrangement of the piping and cut-offs is such that either supply may be turned on as desired, or different parts of the village supplied at will from either source.

The company has recently installed a filtering apparatus, denominated the "Ideal System of Water Purification," and manufactured by the Pittsburg Filter Manufacturing Company of Pittsburg, Pa. This is in connection with the Guilford creek supply and the apparatus is located in a substantially constructed building, built for the purpose, and situated about a mile below the reservoir. In company with Dr. J. V. E. Winne, Health Officer, and Mr. S. F. DeCumber, a member of the board of health, I visited this filter plant but found no one in charge of the same, nor anything to indicate with certainty whether water was passing the filter and into the distributing mains. We, however, took samples of water both for chemical and for bacteriological examination from a penstock in the corner of the building which was apparently connected with the filter, and which the health officer told me was so connected, as he had been informed.

We then visited the reservoir on Guilford creek and found a good flow of water in the stream. Heavy rains had recently fallen and particularly during the preceding night and during the forenoon of the day on which our visit was made. The stream flows through a farming region, with fields on either side in which many cattle are pastured, and these have access to the stream which receives the drainage of the fields. The village of Guilford, some five miles above, is said also to drain into the stream, but I made no particular inspection of the watershed, since this has already been done, but I observed various and evident sources of pollution. Thus a farm house, near the bank of

the creek and close to the reservoir, is so situated that its sewage and slops may readily flow over the surface, or leach through the soil, into the creek, and a single case of typhoid in this dwelling might contaminate the entire water supply, or so much of it at least as is derived from this creek. I was informed that it is asserted that this supply has not recently been generally used, but that after the recent placing of the filter the water was turned on for some weeks and until a day or so before my visit, but on these points I was unable to obtain positive information. The health officer informs me that diarrhœal disorders have been exceedingly and unusually prevalent of late, and are so at the present time, and I am informed that most of the inhabitants of the village use the public water supply.

Samples of water were taken both for chemical and for bacteriological examination from the reservoir, and these, together with the samples from the filter house, were immediately sent to Albany for examination.

From the enclosed reports it will be seen that the results of the chemical examination are fairly satisfactory. The water taken at the filter plant (No. 808) is, from a chemical standpoint, decidedly better than that taken from the reservoir, but I am unable to say whether this water actually passed the filter, and if so at what time and to what treatment subjected, or how long it may have lain in the main with which the penstock from which it was drawn is connected. I am informed by the Director of the Bureau of Pathology that the similar samples sent to him as above described have been examined and that the sample from the filter plant is of unsatisfactory, and that from the reservoir is of satisfactory quality. For this seeming discrepancy I am unable satisfactorily to account, but it is to be borne in mind that the water obtained at the filter may have been drawn from the reservoir some time prior to my visit, and perhaps before the very heavy rain of the preceding night and morning, so that it may have been different in character from that taken directly from the reservoir. And since there was no proof that the water was actually passing through the filter at the time of my visit, I think it would be advisable at some future time to secure further and carefully authenticated samples, both from the reservoir and from the filter as operated, and at a time moreover when

the water in the creek is at a lower stage than at the time of my visit, as I am informed that it often is during the summer months.

Very respectfully yours,

W. G. TUCKER,

Director.

Analysis of Potable Water, No. 808.

(Results are parts in 100,000.)

Received from Sidney, N. Y., and taken by myself. Date received, August 11, 1904; source, filter house, Guilford creek, 3:20 p. m., August 10, 1904; how labelled, "No. 1;" appearance: color, light greenish-yellow tint; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 0.20; free ammonia, 0.0005; albuminoid ammonia, 0.0070;; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0068; total solids (residue colorless), 4.20; loss on ignition, 1.80; behavior during ignition, darkened; mineral matter, 2.40. Remarks: satisfactory quality, but see accompanying report.

W. G. TUCKER,

Director.

Bureau of Chemistry, August 16, 1904.

Analysis of Potable Water, No. 809.

(Results are parts in 100,000.)

Received from Sidney, N. Y., and taken by myself. Date received, August 11, 1904; source, Guilford creek reservoir, 4 p. m., August 10, 1904; how labelled, "No. 2;" appearance: color, greenish-yellow tint; turbidity, very slight; sediment, very slight; odor at 100 degrees F., none; chlorine in chlorides, 0.20; free ammonia, 0.0085; albuminoid ammonia, 0.0110; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; total solids (residue colorless), 5.20; loss on ignition, 2.00; behavior during ignition, darkened; mineral matter, 3.20. Remarks: fairly satisfactory quality, but see accompanying report.

W. G. TUCKER,

Director.

Bureau of Chemistry, August 16, 1904.

SCHENECTADY, N. Y., *August* 19, 1904.

Mr. T. A. STUART, *Acting Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I beg to acknowledge the receipt of the following reports of examinations of the samples of water from the Sidney, N. Y., public water supply:

(1) Report in duplicate. dated August 9, of bacteriological examinations made by Dr. R. M. Pearce, on two samples of water received by him from Dr. J. V. E. Winnie, Health Officer at Sidney, on August 2d.

(2) Report in duplicate, dated August 16th, of bacteriological examinations made by Dr. R. M. Pearce, on two samples of water gathered by Dr. W. G. Tucker at Sidney, on August 10th.

(3) Report in duplicate, dated August 16th, of chemical examinations made by Dr. W. G. Tucker on samples taken by Dr. Tucker himself on August 10th.

Agreeable to your verbal request that I examine these reports and state any conclusions that I may be able to draw from them, I beg to report that I have examined the same but am unable to reach any definite conclusions from these reports as to the effect of the new filter on this water supply, for the following reasons:

(1) In the reports of the samples taken by Dr. Winnie there is nothing to indicate where the two specimens were taken, nor to indicate which was filtered and which unfiltered water.

(2) In the reports on the two specimens taken on August 10th by Dr. Tucker, the report of Dr. Tucker clearly states that he is uncertain whether the sample taken from the filter house had actually been through the filter or not.

(3) The reports of the chemical and biological examinations of the samples taken on August 10th are apparently contradictory.

As the water supply taken from Guilford creek is known to be unsafe without artificial purification and as these reports do not show definitely that such adequate artificial purification has been secured, it would seem proper to permit the injunction against the use of this water to remain in force until you may be able to secure definite determinations of the quality of the filtered water as compared with the unfiltered water.

The reports are herewith respectfully returned to you.

I am, dear sir,

Very truly yours,
OLIN H. LANDRETH,
Consulting Engineer.

PITTSBURG, PA., *August* 22, 1904.

HON. D. LEWIS, *Albany, N. Y.:*

Dear Sir:—Will you kindly send us report on the water from the filter at Sidney water works, Sidney, N. Y.

Some time ago we installed a pressure filter plant for the Sidney water works, and we understand a number of samples have been taken by your Board for analysis, but as yet the filter commissioners of Sidney, N. Y., have not accepted the plant awaiting your report.

We should be glad to have a copy of this for our own information and as soon as possible arrange to advise the water works company, so that they can accept the plant and make a settlement for same.

Awaiting your reply at any early date, we remain,

Yours truly,
PITTSBURG FILTER MFG. CO.,
F. W. JONES,
Vice-President.

ALBANY, N. Y., *August* 29, 1904.

PITTSBURG FILTER MANUFACTURING CO., *Pittsburg, Pa.:*

Gentlemen:—I am in receipt of your communication of the 22d instant, requesting to be furnished with a report on water from the filter of the Sidney water works, Sidney, N. Y.

In reply you are informed that this Department has made no examination of specimens of water for the Sidney water works; we have, however, told a representative of the company under what conditions such examinations would be made for it, but have as yet received no request to make the examinations.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

SIDNEY, N. Y., *September* 27, 1904.

Dr. DANIEL LEWIS, *Albany, N. Y.:*

Dear Doctor:—I would like to hear something in regard to our water from the Guilford creek. In driving by the new filter on Saturday, the man employed there informed me the water was turned on and had been since it had been put up. If that is the case then we are all the time using the water for domestic uses. The Ontario & Western Railroad have been building a new depot at Guilford, putting in new toilet rooms and the drainage is run into the above creek.

The Pittsburg Filter Co. are anxious for their pay and are waiting to have it accepted by the board of health.

Kindly let us hear something in regard to the matter, and oblige,

Very truly yours,

J. V. E. WINNIE, M. D.,

Health Officer.

SIDNEY, N. Y., *October* 4, 1904.

DANIEL LEWIS, M. D.:

Dear Doctor:—Yours of the 29th ult. came to hand. In reply would say that as near as I can ascertain the water from the Guilford creek only comes on this side of the river in Sidney. If so the only parties to get the water from the creek would be the French Cheese Factory.

The water company have several shut-offs between here and filter, so it is hard to tell anything in regard to what they are doing.

At East Guilford, where the filter is located, there are eight or ten families using the water. Of course that is out of my jurisdiction, but properly comes under yours.

The water company are bound to come out ahead and be the boss in whatever they suggest, regardless of their patrons.

DR. J. V. E. WINNIE.

ALBANY, N. Y., *September* 29, 1904.

J. V. E. WINNIE, M. D., *Health Office, Sidney, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 27th instant, in which you state that you have been informed by an

employee of the Sidney Water Works Co. that said company is using water from Guilford creek as part of the supply furnished to the residents of Sidney.

In reply you are informed that the use of such water by the Sidney Water Works Co. was prohibited by this Department and the company in question has no right to distribute the water to the public until this Department is satisfied that the filter plant lately installed has so purified the water as to make it fit for domestic use. It is therefore advised that you investigate as to the statement of the employee referred to and should it be a fact that the Sidney Water Works Co. is using the Guilford creek water, communicate such fact to us that we may take the necessary action in the matter.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

PITTSBURG, PA., *November* 25, 1904.

MR. DANIEL LEWIS, *New York State Department of Health, Albany, N. Y.:*

Dear Sir:—Some six months ago we built a pressure filter plant for the town of Sidney, New York, and the effluent from this plant was to be satisfactory to the State and local board of health before the final payment on the filter was made. We have been endeavoring ever since to secure a report in regard to the effluent and wrote your Department on August 22d, requesting a report on the water furnished by these filters but were advised by your Department, under date of August 29th, that no request had been made by the Sidney Water Company for examination of the water. Will you kindly let us know what has been done in the matter and if you have made any report to the local board of health, kindly furnish us with a copy.

If you have done nothing in the matter, please advise us. We are anxious to secure a settlement from the water company and they are holding us off on the plea that no report has yet been made.

Anything you can do for us to help us out will be greatly appreciated, Yours truly,

PITTSBURG FILTER MFG. CO.,
S. W. JONES,
Vice-President.

ALBANY, N. Y., *November* 29, 1904.

PITTSBURG FILTER MFG. CO., *Pittsburg, Pa.:*

Gentlemen:—I am in receipt of your communication of the 23d inst. in the matter of this Department passing upon the efficiency of a filter plant installed by you for the Sidney Water Company.

In reply you are informed that the manager of the Sidney Water Company was told some months ago that this Department would make an official test at any time it might designate, providing the expenses in connection with same were borne either by the water company or by the Pittsburg Filter Mfg. Company.

We are still ready and willing to make the test under the conditions named, as we do not consider it the duty of this Department to make such tests for a private corporation under any other conditions.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *November* 18, 1904.

DR. A. C. SANTEE, *Health Officer, Town of Wallkill, Scotchtown, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 9th inst., enclosing a petition from citizens of the towns of Montgomery, Hamptonburgh and Wallkill, concerning the alleged pollution of the waters of the Wallkill river.

In reply you are informed that the subject of your complaint is a direct violation of the provisions of section 73 of the Public Health Law, which provides as follows:

"No person or corporation shall permit the discharge or escape of any sewage, or other matter deleterious to public health, or destructive to fish, or throw or cast any dead animal, carrion or offal, or other putrid or offensive matter into the waters of Wallkill creek, in the counties of Ulster or Orange. Any person violating any provision of this section shall forfeit to the county where the violation occurred the sum of fifty dollars for every such violation."

It would seem from the above provision of law, that the attention of the District-Attorney should be called to the violations referred to, that he may proceed to prosecute the offenders.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *January* 21, 1904.

CHARLES S. PREST, M. D., *Health Officer, Waterford, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 19th inst., reporting cases of typhoid fever and requesting to be furnished with sterilized bottles that you may forward samples of water for analyses.

In reply you are informed that two water containers have been sent to you this day under a separate cover.

Kindly procure and forward the specimens in strict compliance with the printed instructions.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *February* 1, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the two specimens of water received from Dr. Charles S. Prest, Health Officer at Waterford, N. Y. Specimens dated January 26th; received here January 27th; analysis started January 28th.

Specimen No. 1—marked "Public Well." There was gas in only one fermentation tube and in that not of the colon type. Agar plates showed 110 organisms per cubic centimeter. Gelatin plates showed 764 organisms per cubic centimeter.

This water is therefore passed.

Specimen No. 2—marked "Schofield Well." There was gas in all fermentation tubes, in one of which it was of the colon type. Agar plates showed only 50 organisms per cubic centimeter, but the gelatin plates were too thickly seeded to count; estimated count of 15,000 to 20,000 organisms per cubic centi-

meter. These plates were partially liquefied with a strong putrefactive and slightly ammoniacal odor.

This water is therefore condemned for household purposes.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *February* 15, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Charles S. Prest, Health Officer at Waterford, N. Y. Specimen dated February 8th; received here February 9th; analysis next day.

Agar plates showed 150 organisms per cubic centimeter. Gelatin plates showed 740 organisms per cubic centimeter. There was gas formation in 4 of the 5 fermentation tubes, in all of which it was of the type characterized by colon bacillus.

This water shows marked organic contamination and is condemned for household purposes.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *February* 29, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Charles S. Prest, Health Officer at Waterford, N. Y. Specimen dated February 24th; received here February 25th; analysis started February 26th; final analysis February 29th.

Agar plates showed 10 organisms per cubic centimeter. Gelatin plates showed 260 organisms per cubic centimeter. There was no gas in any of the fermentation tubes.

This water is therefore passed.

Respectfully submitted,

R. M. PEARCE,

Director.

Albany, N. Y., *March* 14, 1904.

Daniel Lewis, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Charles S. Prest, Health Officer at Waterford, N. Y. Specimen dated March 8th; received here March 9th; analysis March 9th.

Source—"Dug well." Privy vaults in close proximity.

Agar plates showed 12000 organisms per cubic centimeter. Gelatin plates were liquefied with a putrefactive and ammoniacal odor. There was gas in all of the fermentation tubes, in two of which it was of the colon type.

This water is therefore condemned on the basis of organic contamination.

Respectfully submitted,

R. M. PEARCE,

Director.

Albany, N. Y., *April* 12, 1904.

Daniel Lewis, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Charles S. Prest, Health Officer at Waterford, N. Y. Specimen dated April 6th; received April 7th; analysis started April 9th.

Source—"Faucet in schoolhouse."

Agar plates showed 140 organisms per cubic centimeter. Gelatin plates showed 22,000 organisms per cubic centimeter. There was gas in four of the five fermentation tubes, in one of which it was definitely of the colon type.

This water cannot be considered safe with the evidence of colon contamination.

Respectfully submitted,

R. M. PEARCE,

Director.

Albany, N. Y., *August* 11, 1904.

Daniel Lewis, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Charles S. Prest, Health Officer at Waterford,

N. Y. Specimen dated August 8th; received here August 9th; analysis started August 9th.

Agar plates showed 1280 organisms per cubic centimeter. Gelatin plates were not liquefied. There was gas formation in all tubes, in one of which it was of the colon type.

You will note that there is one colon formula and also gas in the other four tubes. This gas was considerable in each. Although there is no evidence of organic contamination to condemn the water, still I would suggest that fairly frequent examination should be made.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *September* 2, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Charles S. Prest, Health Officer at Waterford, N. Y. Specimen taken August 25th; received here August 26th; analysis started the same day; completed the same day.

Specimen taken 10 a. m. from a faucet. The agar count showed no colonies. There was no gas formation in any tube. Gelatin showed a count of approximately 6000 colonies per cubic centimeter, showing no contamination of water.

This water is, therefore, passed.

Respectfully submitted,

R. M. PEARCE,

Director.

NEW YORK, *June* 14, 1904.

HON. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I have been requested by citizens of Waterloo, N. Y., to examine into the practicability of obtaining a supply of water from either Seneca Lake or Phillips Pond. The present supply is taken from the Seneca river, about six miles from the Geneva sewer outfall. They also want some suggestions as to sewering

the village and disposing of the sewage. The natural outlet is into the Seneca river, two and a half miles above Seneca Falls.

I should be glad to have your chemists examine the water of the river and of the proposed sources of supply. If this meets with your approval will you please send me some water containers, addressed to me at the Geneva railroad station, to be called for. I think that four or better, five sets will be needed. My address on Friday and Saturday of this week will be "Nestor House, Geneva."

On Monday, June 20, I expect to go to Raquette Lake for the inspections ordered there at Big Moose Lake. If you want any water samples collected for analysis, please send containers to me at the Raquette Lake railroad station. I suppose that I will be in that vicinity on Tuesday and Wednesday of next week. That will be my postoffice address.

Your obedient servant,

J. J. R. CROES.

ALBANY, N. Y., *June* 24, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the four specimens of water received from the Waterloo committee on sewers and water, which was sent at the request of Mr. J. J. R. Croes, Specimens were all dated June 20th; received at the Laboratory June 21st; analyses started same day.

Specimen A.—"Intake Basin, Waterloo." There was no gas formation in any fermentation tube. Agar plates showed 7600 organisms per cubic centimeter. Gelatin plates were liquefied with a strong ammoniacal and slight putrefactive odor.

Specimen B.—"Seneca river below guard gate." There was gas in all fermentation tubes, in none of which was it of the colon type. Agar plates showed 400 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate ammoniacal and putrefactive odor.

Specimen C.—"Seneca Lake, two miles south of Seneca River, east side." There was no gas formation in any fermentation tube. Agar plates showed 3500 organisms per cubic centimeter. Gela-

tin plates were liquefied with a strong ammoniacal and putrefactive odor.

Specimen D.—"From Phillips Pond, Seneca County." There was no gas formation in any fermentation tube. Agar plates showed 200 organisms per cubic centimeters. Gelatin plates were liquefied with a slight odor.

None of these waters show evidence of organic contamination and all are therefore passed. All, however, show contamination with putrefactive organisms and the bacterial count in Specimen A is rather high.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, *June* 27, 1904.

DR. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith reports in duplicate on the analyses of four samples of water received by your order on the 21st inst., from Mr. A. M. Patterson, for the committee on sewers and water of Waterloo, N. Y., and by request of J. J. R. Croes, C. E. It seemed desirable in these instances to include the determination of "oxygen consumed" which adds valuable information.

These waters present certain peculiarities. The chlorine in the Seneca river and Seneca lake samples is high and may possibly be accounted for by geographical position and geological relations. Nitrites are also present in these samples but otherwise the results do not indicate objectionable sewage pollution, except in case of sample No. 776, which is by no means satisfactory and should be condemned. The Phillips pond sample is quite different from the others and while such a water might not prove satisfactory as a source of supply its contamination is evidently due to the presence of decaying vegetable matter. I have consulted with Dr. Pearce as to results of his bacteriological examination of these samples and they would seem to be quite in agreement with the results of the chemical examination.

Very respectfully yours,

W. G. TUCKER,

Director.

Analysis of Potable Water No. 776.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, N. Y., for committee, by request of J. J. R. Croes, C. E. Date received, June 21, 1904; source, Seneca river, Waterloo waterworks intake basin; how labelled, "A;" appearance: color, yellowish-green tint; turbidity, none; sediment, slight; odor at 100 degrees F., slight; chlorine in chlorides, 4.80; free ammonia, 0.0165; albuminoid ammonia, 0.0120; nitrogen as nitrites, 0.0011; nitrogen as nitrates, 0.0208; oxygen consumed from permanganate, 0.1965; total solids (residue colorless), 22.60; loss on ignition, 5.20; behavior during ignition, darkened; mineral matter, 17.40. Remarks: appearance fairly good; odor slight; chlorine high and free ammonia high; nitrites present; oxygen consumed not excessive. Results not satisfactory and water inferior to the other and accompanying samples.

W. G. TUCKER,
Director.

Bureau of Chemistry, June 27, 1904.

Analysis of Potable Water No. 777.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, N. Y., for committee, by request of J. J. R. Croes, C. E. Date received, June 21, 1904; source, Seneca river, guard gate at inlet from Seneca lake; how labelled, "B;" appearance; color, light greenish tint; turbidity, none; sediment, trifling; odor at 100 degrees F., none; chlorine in chlorides, 4.80; free ammonia, 0.0005; albuminoid ammonia, 0.0030; nitrogen as nitrites, 0.0005; nitrogen as nitrates, 0.0232; oxygen consumed from permanganate, 0.1315; total solids (residue colorless), 20.80; loss on ignition, 4.20; behavior during ignition, darkened slightly; mineral matter, 16.60. Remarks: appearance, good; chlorine high; ammonias, low; nitrites present but low and oxygen consumed low. Similar to No. 778 and superior to No. 776. Aside from chlorine and presence of nitrites this water is of satisfactory quality.

W. G. TUCKER,
Director.

Bureau of Chemistry, June 27, 1904.

Analysis of Potable Water No. 778.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, N. Y., of committee, by request of J. J. R. Croes, C. E. Date received, June 21, 1904; source, Seneca lake, two miles south of inlet to Seneca river; how labelled, "C;" appearance: color, very light greenish tint; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 4.70; free ammonia, 0.0005; albuminoid ammonia, 0.0040; nitrogen as nitrites, 0.0004; nitrogen as nitrates, 0.0272; oxygen consumed from permanganate, 0.1165; total solids (residue colorless), 20.80; loss on ignition, 4.40; behavior during ignition, darkened slightly; mineral matter, 16.40. Remarks: appearance good; chlorine high; ammonias low; nitrites present but low and oxygen consumed low. Similar to No. 777, and superior to No. 776. Aside from chlorine and presence of nitrites this water is of satisfactory quality.

W. G. TUCKER,

Bureau of Chemistry, June 27, 1904. *Director.*

Analysis of Potable Water No. 779.

(Results are parts in 100,000.)

Received from A. M. Patterson, Waterloo, N. Y., of committee, by request of J. J. R. Croes, C. E. Date received, June 21, 1904; source, Phillips pond, Seneca County, N. Y.; how labelled, "D;" appearance; color, decided greenish-yellow tint; turbidity, none; sediment, very slight; odor at 100 degrees F., none; sediment, very slight; odor at 100 monia, 0.0005; albuminoid ammonia, 0.0130; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0000; oxygen consumed from permanganate, 0.6165; total solids (residue yellowish), 17.40; loss on ignition, 6.80; behavior during ignition, blackened; mineral matter, 10.60. Remarks: appearance not very good; chlorine low; albuminoid ammonia rather high; oxygen consumed high. Quite different from other accompanying samples; appearance not so good, chlorine very much lower and nitrites absent. Total ammonias lower than in No. 776, but higher than in Nos. 777 and 778 and oxygen consumed much higher. Results indicative of vegetable pollution and fairly satisfactory for a pond water.

W. G. TUCKER,

Bureau of Chemistry, June 27, 1904. *Director.*

NEW YORK, *July* 9, 1904.

HON. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—The analyses of the Seneca lake and Seneca river water made June 21st showed such curious and anomalous results that I think that other samples should be analyzed. The samples for biological examination were kept so long after being taken that the results cannot be relied on. I took them on June 18th, but they were not forwarded to Dr. Pearce until Monday, June 20th, and received by him the next day.

The lake water two miles south of the outlet showed 3500 organisms; the water from the junction of the Seneca river and the Seneca canal showed 400 organisms and the water from the canalized river five miles from the lake showed 7600 organisms.

In the chemical analysis the presence of chlorine in excess and of nitrites in the lake water was not satisfactory. You know that ten years ago I succeeded in satisfying the State Board of Health that no injurious effects were to be expected, for a long time at least, from discharging the Geneva sewage into Seneca lake. The question now is, has the sewage so discharged caused a manifest deterioration of the water on the east shore of the lake at the mouth of Seneca river and two miles to the south?

I have directed samples for analysis to be taken from the pumps of the Geneva water works, from the lake shore on the east, opposite the water works, from the Seneca river outlet, and from the Waterloo pumps five miles down the river, on Monday, and to be forwarded immediately in a cold box to Professors Pearce and Tucker. I will be pleased to know the results.

Your obedient servant,

J. J. R. CROES,

Consulting Engineer.

ALBANY, N. Y., *July* 15, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the four specimens of water received from Mr. J. J. R. Croes, 68 Broad street, New York, N. Y. All specimens dated July 11th; received here July 12th; analysis started same day.

Specimen No. 1—"Waterloo Pump Station." Agar plates showed 790 organisms per cubic centimeter. Gelatin plates were completely liquefied with a moderate putrefactive odor. There was gas formation in all fermentation tubes, in none of which was it of the colon type.

Specimen No. 2—"Seneca Outlet above junction with Canal." Agar plates showed 4400 organisms per cubic centimeter. Gelatin plates were liquefied with a slight odor. There was no gas formation in any fermentation tube.

Specimen No. 3—"East side of Seneca Lake, two miles above outlet." Agar plates showed 9000 organisms per cubic centimeter. Gelatin plates were not liquefied; there was slight odor. There was gas formation in all fermentation tubes, in one of which it was very suspicious, although not exactly that of the colon bacillus.

Specimen No. 4—"Geneva Pump Station." Agar plates showed 7200 organisms per cubic centimeter. Gelatin plates were liquefied with a slight odor. There was gas formation in all tubes, in none of which was it of the colon bacillus.

None of these waters, with the exception possibly of No. 3, show any trace of organic contamination and are all passed as safe waters. No. 3, however, should be held in some suspicion.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *July* 20, 1904.

DR. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith reports in duplicate on the analysis of four samples of water received by your order on the 12th instant, from Waterloo, N. Y., by J. J. R. Croes, C. E.

The results on the whole are more satisfactory than those obtained on the analysis of three samples from same locality and reported upon on June 27 last, although the differences are not very decided. Chlorine is high in all the samples, as in the last lot, and this must be due, I think, to the natural character of this water, since the other results do not indicate such sewage pollution as this might otherwise imply. It will be observed

that nitrites, which were present in the preceding samples from Seneca river and Seneca lake, are absent in the samples now reported upon.

With the exception of sample No. 793, which is distinctly inferior to the other samples, these waters are of satisfactory quality. They present no very decided differences, although No. 795 is rather better than the others. I am informed by the Director of the Bureau of Pathology that he has made a bacteriological examination of these samples and finds them satisfactory excepting sample from east side of lake, which he deems questionable.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

Analysis of Potable Water No. 793.

(Results are parts in 100,000.)

Received from Waterloo, N. Y., by J. J. R. Croes. Date received, July 12, 1904; source, "Waterloo pump station;" how labelled, "A;" appearance: color, greenish-yellow tint; turbidity, distinct; sediment, slight; odor at 100 degrees F., very slight; chlorine in chlorides, 4.60; free ammonia, 0.0195; albuminoid ammonia, 0.0130; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0168; oxygen consumed from permanganate, 0.1765; total solids (residue colorless), 22.80; loss on ignition, 5.20; behavior during ignition, darkened; mineral matter, 17.60. Remarks: Appearance of this water not so good as accompanying samples. Ammonias and oxygen consumed likewise higher. Results not very satisfactory and water inferior to the other samples. See letter accompanying report.

W. G. TUCKER,

Director.

Bureau of Chemistry, July 20, 1904.

Analysis of Potable Water No. 794.

(Results are parts in 100,000.)

Received from Waterloo, N. Y., by J. J. R. Croes. Date received, July 12, 1904; source, "Seneca outlet *above* junction with canal;" how labelled, "B;" appearance: color, light greenish tint; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 4.60; free ammonia, 0.0045; albuminoid

ammonia, 0.0080; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0236; oxygen consumed from permanganate, 0.1065; total solids (residue colorless), 21.40; loss on ignition, 4.60; behavior during ignition, darkened; mineral water, 16.80. Remarks: Satisfactory quality, but see letter accompanying report.

W. G. TUCKER,
Bureau of Chemistry, July 20, 1904. *Director.*

Analysis of Potable Water No. 795.

(Results are parts in 100,000.)

Received from Waterloo, N. Y., by J. J. R. Croes. Date received, July 12, 1904; source, "Seneca Lake, east side, two miles above outlet;" how labelled, "C;" appearance: color, light greenish tint; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 4.70; free ammonia, 0.0005; albuminoid ammonia, 0.0025; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0308; oxygen consumed from permanganate, 0.0965; total solids (residue colorless), 22.60; loss on ignition, 6.20; behavior during ignition, darkened slightly; mineral matter, 16.40. Remarks: Satisfactory quality, but see letter accompanying report.

W. G. TUCKER,
Bureau of Chemistry, July 20, 1904. *Director.*

Analysis of Potable Water No. 796.

(Results are parts in 100,000.)

Received from Waterloo, N. Y., by J. J. R. Croes. Date received, July 12, 1904; source, "Geneva pump station;" how labelled, "D;" appearance: color, light greenish tint; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 4.70; free ammonia, 0.0013; albuminoid ammonia, 0.0060; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0268; oxygen consumed from permanganate, 0.0915; total solids (residue colorless), 22.40; loss on ignition, 4.60; behavior during ignition, darkened slightly; mineral matter, 17.80. Remarks: Satisfactory quality, but see letter accompanying report.

W. G. TUCKER,
Bureau of Chemistry, July 20, 1904. *Director.*

ALBANY, N. Y., *October* 29, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir.—Following is the report on the specimen of water received from Dr. Wm. W. Carleton, health officer at Waterloo, N. Y. Specimen dated October 24th; received here October 25th; analysis started same day.

Source—" Deyoe well." Agar plates showed 15,500 organisms per cubic centimeter. Gelatin plates were liquefied with an ammoniacal and putrefactive odor. There was gas in only one fermentation tube, but in this it was almost exactly that of the colon bacillus.

This water shows a moderately high bacterial count and almost certain organic contamination and should not be used for household purposes without boiling.

Respectfully yours,

R. M. PEARCE,

Director.

ALBANY, N. Y., *December* 5, 1904.

DR. DANIEL LEWIS, *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. Wm. W. Carleton, health officer at Waterloo, N. Y. Specimen dated November 29th; received here November 31st; analysis started December 1st.

Source—" Disbrough Well." Agar plates showed 4,700 organisms per cubic centimeter. Gelatin plates showed 900 organisms per cubic centimeter. There was no gas formation in any fermentation tube.

This water shows no evidence of organic contamination and is passed.

Respectfully submitted,

R. M. PEARCE,

Director

ALBANY, N. Y., *February* 29, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on the specimen of water received from Dr. L. B. Rulison, health officer at Watervliet, N. Y. Specimen dated February 23d; received here February 24th; analysis, February 24th; final analysis, February 27th.

Specimen marked "Faucet."—Agar plates showed 56,000 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate putrefactive odor. There was gas in only one tube in which it was definitely of the colon type.

This water is condemned on the basis of organic contamination and high bacterial count.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *July* 9, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir:—Following is the report on two specimens of water received from Dr. L. B. Rulison, health officer at Watervliet, N. Y. Specimens dated July 2nd; received here July 4th; analyses started July 6th.

Specimen No 1. "Faucet."—Agar plates showed 2,400 organisms per cubic centimeter. Gelatin plates were liquefied with a strong ammoniacal and putrefactive odor. There was gas formation in all tubes, in none of which was it of the colon type.

Specimen No. 2. "Old Reservoir."—Agar plates showed 24,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong ammoniacal and putrefactive odor. There was gas formation in all tubes, in none of which was it of the colon type.

These specimens both show contamination with putrefactive organisms but in neither is it of sufficient grade to justify condemnation of the water. However, in the water from the "Old Reservoir" the bacterial content is very high and although there

is no direct evidence of organic contamination this water cannot be considered good and boiling is recommended before use.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *August* 10, 1904.

L. B. RULISON, M. D., *Health Officer, Watervliet, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 8th instant, calling attention to the use of an old reservoir by the authorities of the city of Watervliet in supplying the city with water, and note your request that a representative of this Department make an investigation of the subject of the water supply.

Some few years ago this Department advised the abandonment of the use of water from the old reservoir, the water of which was found to be impure, and we have every reason to suppose that the same conditions found to exist at that time, obtain now.

The matter will be taken up within a few days when Professor Landreth will be detailed to go over the ground again and determine as to the present conditions.

Professor Landreth will notify you when he can arrange to make the investigation and when on the ground can take specimens of the water for analyses if necessary.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *August* 22, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City.*

Dear Sir:—Following are the reports on the four specimens of water received from Mr. O. H. Landreth, Schenectady, N. Y.

Specimen No. 1.—From "Watervliet filter basin on top of filling material, unfiltered water;" specimen No. 2, from "Watervliet public water supply from south settling basin, unfiltered water;" specimen No. 3, "Watervliet supply, from northeast corner, old reservoir;" specimen No. 4, "Watervliet water supply from sprouting jet, issuing from 12-inch outlet main from old and new reservoirs to city."

All waters were dated August 17th; received August 19th; analyses started the same day.

Specimen No. 1.—Agar plates showed 13,000 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate putrefactive odor. There was gas formation in three tubes, in none of which was it of the colon type.

Specimen No. 2.—Agar plates showed 3,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong putrefactive odor. There was gas formation in four tubes, none of which was of the colon type.

Specimen No. 3.—Agar plates showed 2,800 organisms per cubic centimeter. Gelatin plates were liquefied with a moderate putrefactive odor. There was a trace of gas in two tubes, in neither of which was it of the colon type.

Specimen No. 4.—Agar plates showed nearly 15,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong putrefactive and ammoniacal odor. There was gas formation in all tubes, in none of which was it of the colon type.

Specimens Nos. 1 and 4 showed a rather high bacterial count. Specimens 2 and 4 showed contamination with putrefactive organisms. None, however, showed organic contamination, and all are passed.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *October* 6, 1904.

L. B. RULISON, M. D., *Health Officer, Watervliet, N. Y.:*

Dear Sir:—I inclose herewith copy of a report made by Prof. Olin H. Landreth, covering his recent investigation as to the water supply of the city of Watervliet.

Your attention is called to the recommendations of Professor Landreth, which are approved by this Department, and it is directed that the Board of Health of the city of Watervliet take the necessary action looking to the securing of a pure supply of water for its citizens either by a change from the present source or by the installation of a modern and efficient filtration plant.

Kindly keep me advised as to such action as may be taken in the matter.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

Schenectady, N. Y., *September* 24, 1904.

Dr. Daniel Lewis, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—In the matter of the alleged impure water supply of the city of Watervliet, N. Y., which you requested me to investigate, I beg to say that I have made several inspections and examinations of the different portions of the water plant particularly concerned in the purity of the supply, and beg to submit the following report thereon:

The request for the investigation came from the city board of health of Watervliet and was due to an unusual prevalence of typhoid fever, diphtheria and scarlet fever in the city during the present year, taken in connection with the fact that previous examinations had shown the water supply to be extremely questionable if not dangerous in character.

As furnished me by the health officer, Dr. L. B. Rulison, the following is a list of the cases of the above mentioned three diseases as reported to the board of health:

Months, 1904.	Typhoid fever cases.	Diphtheria cases.	Scarlet fever cases.
January	3	..	1
February	37	7	2
March	7	2	4
April	4	7	8
May	4	10	3
June	..	28	1
July	..	1	4
August	..	1	1
Total in eight months	55	56	24

As the population of Watervliet is something less than 15,000, it is clearly evident that the numbers of cases of the above three diseases is above the normal. Of these three cases, typhoid fever is more directly dependent on the water supply, and the more closely indicative of the quality of water used by the public.

The city of Watervliet is supplied by a private water company styled the Watervliet Hydraulic Company, of which Mr. John C. Chamberlain, of Bridgeport, Conn., is president, the

present company having been reincorporated in 1902 under the New York law governing water companies. In the administration of waterworks affairs the city is represented by a board of water commissioners composed of Mayor Abram Hilton and Messrs. F. B. Durant and H. S. Darby.

The public water supply furnished by the Watervliet Hydraulic Company comes from two sources: (1) Water pumped from the Mohawk river at a point near Dunsbachs Ferry to the reservoirs and filter situated about two miles west of the city of Watervliet, from which reservoirs the water flows by gravity to the distribution system in the city; (2) surface water gathered from a small stream and stored in the "old reservoir," formed by throwing a dam across the stream and situated near the above mentioned new reservoirs.

Throughout the investigation the officials of the hydraulic company who are located in Watervliet have declined to give the information desired, either from ignorance of the facts or from a disinclination to have the facts known, and hence most of the information and statistics contained in this description of the plant have been gathered as accurately as possible from observation. If the information which the officials have declined to give was important to this inquiry, I should ask that the officials be subpoenaed and required to secure and furnish the facts and statistics asked for, but it has been possible to reach definite conclusions independently of the company's local officials.

From my examination it appears probable that the greater proportion of the water furnished the city comes from the Mohawk river, though there is little doubt that all the water available from the old reservoir system is also being utilized. The new reservoir and filter system comprises two storage basins which receive the water pumped from the Mohawk river pumping station, and which contained at the time of my several inspections from six to eight million gallons of water. From these basins the water flows by gravity to a sand filter bed of something less than one-half acre in area. After passing down through the sand filter the water is gathered in a clear water basin in the center of the filter from which it flows to the city by gravity, and unites on its way with the gravity main from the old reservoir. The amount of water consumed has not been

definitely determined by me. According to the present superintendent of the hydraulic company, Mr. O'Shaughnessy, the amount now being pumped is about 5,000,000 gallons per day, and a measurement of the pump dimensions and an account of revolutions made by me would seem to lend some color to this estimate, or even to indicate a greater pumpage than this, although the present condition of the pumps renders it impossible to determine with accuracy the proper allowance to be made for the slip of the pumps. Judging from the population and the mileage of water mains it is hardly likely that more than 2,500,000 or 3,000,000 gallons per day at most reaches the city, and making allowance for a reasonable measure of leakage in the gravity main between the filter and the city, it is hardly likely that much more than 3,000,000 gallons per day passes through the filter. The wide discrepancy between the amount of pumpage as stated by the superintendent and the amount estimated to reach the filter is a matter of importance to the water company, and possibly also to the city board of water commissioners, and is a question of quantity and adequacy of the supply rather than one of quality and suitability of the water itself, to which this inquiry is directed. The question is raised here simply on account of its bearing on the suitability of the filter; if the superintendent's statement of 5,000,000 gallons daily pumpage is correct, and if the estimated loss of 2,000,000 gallons occurs between the pumping plant and the filter, it follows that the filter is being crowded to a rate of over 6,000,000 gallons per acre per day, which is unprecedented and without any warrant in filter operations. If, however, my estimate of the amount of water reaching the filter is too large, as would seem to be the case from the population of the city, then the loss of water between the pump station and the filter is even greater than 2,000,000 gallons per day, and there still remains an unwarranted and overburdening rate of filtration per acre per day. Added to the fact of the unwarranted rate of filtration two other points are to be considered in judging of the suitability of the filtered water: (1) The water of the Mohawk river is densely polluted by the sewage and manufacturing waste of Schenectady, Amsterdam, Johnstown, Gloversville and a score of other villages and cities along the river and its tributaries; (2) the filter is not

cleaned with sufficient frequency to maintain it in anything like an efficient condition, and its construction in a single bed precludes the possibility of cleaning a portion of the filter and using the remaining portion, so that whenever the filter is cleaned, which it has only been on two or three occasions during its life, it becomes necessary to furnish unfiltered water to the city.

The new reservoir system has therefore the following defects in its filtration feature: (1) The rate of filtration per acre per day is unwarranted even for filters maintained in good condition; (2) The water delivered to the filter is highly polluted with the most dangerous form of organic pollution, viz., sewage from an immense urban pollution; (3) the filter is not cleaned with sufficient frequency; (4) the filter not being in duplicate nor subdivided, it is not possible to clean it without furnishing unfiltered Mohawk river water to the people of Watervliet.

The new and the old reservoir systems are so arranged that the overflow from the new reservoirs when they are full passes into the old reservoir, but it has been authoritatively stated that the new reservoirs have not overflowed during the past two years at least, and hence whatever water is stored in the old reservoir is that gathered directly from its own drainage area. This drainage area comprises fertile farming country fairly closely built up, the topography of which would be classed as rolling or hilly, and the soil of which is somewhat porous on the surface underlaid generally by impervious strata. The natural banks of the old reservoir are composed of clay and impervious material, and the water of the reservoir at the time of both my inspections of it was highly turbid and also colored a greenish tint with minute forms of water-vegetable life and presented an objectionable and offensive appearance. These indications of its unsuitable quality are verified by chemical and biological examinations made at various times during the present year, and show the water to be unsafe for potable purposes. The examination of the drainage area of the old reservoir and the streams leading to it appeared to indicate that little water enters this reservoir except during wet weather and when the ground was frozen. This condition is clearly favorable to a flushing of the surface impurities into the reservoir at times of rain and thaw. The large amount of

mineral water of a very fine character giving the high turbidity to the water is in itself, apart from its organic pollution, a serious matter for the water and should alone condemn it if water free from this objection can possibly be found.

Both waters are therefore, in my opinion, entirely unfit for use as at present furnished, and moreover, neither water, in my opinion, conforms to the agreement now in force between the hydraulic company and the board of water commissioners of the city of Watervliet, which stipulates that "The Watervliet Hydraulic Company shall furnish a good and sufficient supply of pure and wholesome filtered water * * * through the existing fire hydrants, drinking fountains, fire taps, water-closets and faucets in all public buildings in said city (of Watervliet), which shall include all water to be used in schoolhouses, * * * ." In the case of a private water company furnishing a city with its public water supply the obligation to furnish for such supply pure and wholesome water is unquestionably implied and is binding even in the absence of a specific stipulation to that effect, but when the quality of the water to be furnished is, as in the present instance, required to be "pure and wholesome filtered water" for fire hydrants, drinking fountains, water-closets and faucets in all public buildings and in schoolhouses, and of necessity of the same quality for all other purposes supplied by the common pipe system, then the obligation rests on a stronger and more explicit basis than that of implication. The present renewed contract between the city and the hydraulic company, dated October 8, 1903, and operative until October 1, 1905, not only provides "a ten-days storage supply of not less than 15,000,000 gallons of water in the new reservoirs," but also provides that the said company shall "clean the said filter bed upon demand of said water board." I was not informed when or how often the board of water commissioners had called on the hydraulic company to clean the water filter, but I do not understand that even had the water board failed to demand the cleaning of the filter this would not relieve the hydraulic company from the obligation to furnish "good and wholesome filtered water." There is one point which in my opinion should be radically altered if the present contract or any contract is renewed with this or any other company. I refer to the clause

permitting the hydraulic company to furnish for two days unfiltered Mohawk river water even though it be, as stipulated, "well settled." It is hardly necessary for me to say that no feasible amount of settling will render the Mohawk river water as at present polluted, safe for potable purposes, and that its use for even two days or two hours is attended with danger to the public who use it. The present state of the art of water filtration does not warrant—and has not for some time past warranted—the continuation of the crude form of filtration now in use at Watervliet, and this should be superseded at once by more modern and more efficient methods or features, which alone are suitable to furnish the stipulated "filtered water" called for both by the spirit and letter of the contract. The time has long since passed when water which has passed through sand or other fine material can claim, solely on that account, to be "pure and wholesome filtered water." Neither is it necessary for the city officials and the general public to remain in ignorance or doubt as to the current character or quality of the water being furnished from day to day, nor to depend on bare assumption as to its safety or danger. It is easily feasible to have maintained a regular system of water examinations, both biological, and chemical, by which the true character of the city water at all times, or as least at frequent intervals, shall be regularly determined and published for the information of the water officials and for the assurance or warning of the public who use the water supply. The cost of such systematic examinations would be insignificant in comparison with the results in the way of stimulation to the water company, information to city water officials in dealing with water questions, and an enlightened interest of the public in water matters in general and an intelligent acquaintance with the elements of safety and danger of the water supply. Many other cities and villages have instituted the scheme of systematic water examinations, and in every instance, I think, it has been followed by improvements in the water departments concerned. I have in mind especially, beside Albany, the other large cities of Elmira, Binghamton, Middletown, Poughkeepsie, Yonkers, Tarrytown, etc.

As a result of my examination and of the facts and conditions developed thereby, I beg to submit the following summary of my conclusions:

(1) During the first eight months of the present year, there has been an abnormal prevalence of typhoid fever, diptheria and scarlet fever in the city of Watervliet, the typhoid fever having been most frequent during February and March and the diphtheria most prevalent during May and June. Dysentery and other enteric diseases not reported.

(2) The water of the old reservoir is highly turbid and analyses of the water show it to be unfit for domestic use. This is verified by the physical conditions on the watershed.

(3) The water of the Mohawk river from which the bulk of the supply is drawn is highly polluted with city sewage from a large population within a short distance from the intake, and in an unfiltered state is unfit for domestic use.

(4) The rate of filtration at the filter in the new reservoirs is much too high to secure a safe degree of purification, and no provision is there made for cleaning the filters systematically nor without cutting off filtered water altogether and furnishing unfiltered water during the time the filters are out of use. Two alternative evils are therefore open to the hydraulic company and the city: (a) to clean the filters as frequently as their condition demands it and while they are being cleaned to deliver unfiltered and dangerously polluted water to the public; or (b) to reduce the frequency of cleaning and the frequency of delivering unfiltered water to the public, and to thus permit the filter to become foul and inefficient as a purifying agent.

The filter is, in other words, both inadequate in size, and incomplete in features permitting cleaning without interruption of filtration.

(5) The contract now in force between the city of Watervliet and the Watervliet Hydraulic Company under which the latter company supplies water for fire purposes, drinking fountains, public buildings including schools, specifically stipulates that this water shall be "pure and wholesome filtered water." By implication and by necessity, as there is but one pipe system for both public water and water supplied to the individual consumers, the same quality of water is due the public at large.

From the above conclusions I beg to submit the following recommendations for remedial steps:

1. That the board of health of the city of Watervliet be directed under sections 25 and 31 of the Public Health Law, to

effectively prohibit the furnishing of water from the old reservoir as a part of the city supply, and to take such steps as may be necessary to enforce and maintain the prohibition.

2. That the board of health of the city of Watervliet be directed to coöperate with the city board of water commissioners in securing the most efficient purification possible from the present water filter at the new reservoirs until such time as it may be suitably superseded, and in doing so that careful attention be given to the matter of the proper frequency of cleaning the filter and the selection of a time for cleaning the filter when the Mohawk river water shall be in the most suitable stage and condition to be used unfiltered.

3. That the city board of health and the city board of water commissioners be strongly urged to coöperate in prompt and vigorous measures to secure, with the least possible delay, a change from the Mohawk river as a source of supply, or the early installation of a modern and efficient water filtration plant.

4. That the city board of health be directed to keep this Department advised as to what steps and progress are being made in the carrying out of the above recommendations.

I am, dear sir, Very truly yours,

OLIN H. LANDRETH.

Consulting Engineer.

PROTECTION OF WATER SUPPLIES.

In accordance with Article V of the Public Health Law, rules for the protection of the sources of water supplies were prepared and enacted during the year as follows:

CORINTH WATER SUPPLY RULES.

Rules and Regulations for the Protection from Contamination of the Public Water Supply of the Village of Corinth, N. Y., enacted by the New York State Commissioner of Health under Chapter 661 *of the Laws of* 1893, *and Chapter* 251 *of the Laws of* 1899.

Abstract of the New York State Public Health Law providing for the protection from contamination of public water supplies throughout the State. Chapter 661 of the Laws of 1893, as amended by chapter 251 of the Laws of 1899.

§ 70. The State Board of Health may make rules and regulations for the protection from contamination of any or all

public supplies of potable waters and their sources within the state. If any such rule or regulation relates to a temporary source or act of contamination, any person violating such rule or regulation shall be liable to prosecution for misdemeanor for every such violation, and on conviction shall be punished by a fine not exceeding two hundred dollars, or imprisonment not exceeding one year, or both. If any such rule or regulation relates to a permanent source or act of contamination, said board may impose penalties for the violation thereof or the noncompliance therewith, not exceeding two hundred dollars for every such violation or noncompliance. Every such rule or regulation shall be published at least once in each week, for six consecutive weeks, in at least one newspaper of the county where the waters to which it relates are located. The cost of such publication shall be paid by the corporation or municipality benefited by the protection of the water supply to which the rule or regulation published relates. The affidavit of the printer, publisher or proprietor of the newspaper in which such rule or regulation is published may be filed, with the rule or regulation published, in the county clerk's office of such county, and such affidavit and rule and regulation shall be conclusive evidence of such publication, and of all the facts therein stated, in all courts and places.

§ 71. The officer or board having by law the management and control of the potable water supply of any municipality, or the corporation furnishing such supply, may make such inspection of the sources of such water supply as such officer, board or corporation deems it advisable, and to ascertain whether the rules or regulations of the state board are complied with. If any such inspection discloses a violation of any such rule or regulation relating to a permanent source or act of contamination, such officer, board or corporation shall cause a copy of the rules or regulations violated to be served upon the person violating the same, with a notice of such violation. If the person served does not immediately comply with the rule or regulation violated, such officer, board or corporation shall notify the state board of the violation, which shall immediately examine into such violation; and if such person is found by the state board to have actually violated such rule or regulation, the secretary of the state board shall order the local board of health of such municipality to con-

vene and enforce obedience to such rule or regulation. If the local board fails to enforce such order within ten days after its receipt, the corporation furnishing such water supply or the municipality deriving its water supply from the waters to which such rule or regulation relates, may maintain an action in a court of record, which shall be tried in the county where the cause of action arose against such person, for the recovery of the penalties incurred by such violation, and for an injunction restraining him from the continued violation of such rule or regulation.

All rules and regulations heretofore duly made and published for the sanitary protection of public water supplies, pursuant to chapter five hundred and forty-three of the laws of eighteen hundred and eighty-five, and chapter six hundred and sixty-one of the laws of eighteen hundred and ninety-three, as amended, are hereby legalized, ratified, confirmed and continued in force, until new rules and regulations become operative.

This act shall not be construed to repeal or affect any of the provisions of chapter three hundred and seventy-eight of the laws of eighteen hundred and ninety-seven, or its amendments.

§ 72. Sewerage.—When the State Board of Health shall, for the protection of a water supply from contamination, make orders or regulations the execution of which will require or make necessary the construction and maintenance of any system of sewerage, or a change thereof, in or for any village or hamlet, whether incorporated or unincorporated, or the execution of which will require the providing of some public means of removal or purification of sewage, the municipality or corporation owning the water-works benefited thereby shall, at its own expense, construct and maintain such systems of sewerage or change thereof, and provide such means of removal and purification of sewage and such works or means of sewage disposal as shall be approved by the State Board of Health. When the execution of any such regulations of the State Board of Health will occasion or require the removal of any building or buildings, the municipality or corporation owning the water-works benefited thereby shall, at its own expense, remove such buildings and pay to the owner thereof all damages occasioned by such removal. When the execution of any such regulation will injuriously affect any manufacturing

or industrial enterprise which is not a public nuisance, such municipality or corporation shall pay all damages occasioned by the enforcement thereof. Until such construction or change of such system or systems of sewerage, and the providing of such means or removal or purification of sewage and such works or means of sewage disposal, and the removal of any building, are so made by the municipality or corporation owning the waterworks to be benefited thereby at its own expense, there shall be no action or proceeding taken by such municipality or corporation against any person or corporation for the violation of any regulation of the State Board of Health under this article, and no person or corporation shall be considered to have violated or refused to obey any such rule or regulation. The owner of any building the removal of which is occasioned or required, or which has been removed by any rule or regulation of the State Board of Health made under the provisions of this article, and all persons whose rights of property are injuriously affected by the enforcement of any such rule or regulation, shall have a cause of action against the municipality or corporation owning the water works benefited by the enforcement of such rule or regulation, for all damages occasioned or sustained by such removal or enforcement, and an action therefor may be brought against such municipality or corporation in any court of record in the county in which the premises or property affected is situated and shall be tried therein, or such damages may be determined by a special proceeding in the supreme court or the county court of the county in which the property is situated. Such special proceedings shall be commenced by petition and notice to be served by such owner upon the municipality or corporation in the same manner as for the commencement of condemnation proceedings. Such municipality or corporation may make and serve an answer to such petition as in condemnation proceedings. The petition and answer shall set forth the claims of the respective parties, and the provisions of the condemnation law shall be applicable to the subsequent proceedings upon the petition and answer, if any. Either party may before the service of the petition or answer respectively, offer to take or pay a certain sum, and no costs shall be awarded against either party unless the judgment is more unfavorable to him than his offer.

Section 2 of chapter 29 of the laws of 1901, which provides for the substitution of the State Department of Health for the State Board of Health, reads as follows:

Section 2. Whenever the term "State Board of Health" occurs or any reference is made thereto in any law, it shall be deemed to mean and refer to the Department of Health as created by this act. The Commissioner of Health shall have all the powers conferred and perform all the duties imposed by law upon the "State Board of Health," or any member, committee or officer thereof, including the secretary.

RULES AND REGULATIONS.

The following rules and regulations shall apply to the reservoirs from which water is drawn for the public water supply of Corinth, N. Y., as well as to all watercourses entering or ultimately discharging into the same.

The term "reservoirs" wherever used in these rules is intended to mean and include the reservoirs above referred to. The term "watercourse" wherever used in these rules is intended to mean and comprise every spring, stream, ditch, gutter, or other watercourse of every kind, the waters of which when running, whether continuously or occasionally, eventually flow or may flow into either of the above-named reservoirs. Wherever distances from reservoirs or watercourses are mentioned they are intended to mean the horizontal distances from the high-water line of such reservoir or the edge, margin or precipitous bank forming the ordinary normal high-water mark of such watercourse.

PRIVIES ADJACENT TO RESERVOIRS OR WATERCOURSES.

1. No privy, privy vault, pit, cesspool, or any other receptacle of any kind used fo' either temporary storage or the permanent deposit of human excreta shall be constructed, placed or maintained with its nearest point within fifty (50) feet of any reservoir or watercourse of the Corinth public water supply.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed or maintained with its nearest point within two hundred (200) feet of any reservoir or within one

hundred and fifty (150) feet of any watercourse of the Corinth water supply.

3. Every privy, privy vault, pit, cesspool or other receptacle or place used for the temporary storage of human excreta which is constructed, located or maintained within the aforesaid two hundred (200) feet of any reservoir, or within the aforesaid one hundred and fifty (150) feet of any water course of the Corinth public water supply, from which privy or other receptacle the excreta are not at once removed automatically by means of suitable water-tight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall at all times be maintained in an absolutely water-tight condition and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid receptacles shall be removed and the receptacles thoroughly cleaned and deodorized as often as may be found necessary in order to maintain the privy in proper sanitary condition and to effectively prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specifically ordered or permitted by the State Commissioner of Health, the excreta collected in the aforesaid receptacles shall, when removed, be disposed of by burying in trenches or by thoroughly digging into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at distances not less than three hundred (300) feet from any reservoir or any water course of the Corinth public water supply.

6. Whenever it shall be found that owing to the character of the soil or of the surface of the ground, or owing to the height or

flow of subsoil, or surface water, or other special local conditions, the excremental matter, from any privy or aforesaid receptacle, or from any trench or place of disposal may, in the opinion of the State Commissioner of Health, be washed over the surface or through the soil in an imperfectly purified manner into any reservoir or watercourse of the public water supply of the village of Corinth, then the said privy or receptacle for excreta or the said trench or place of disposal shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

SEWAGE, HOUSE SLOPS, SINK WASTE, ETC.

7. No houseslops, bathwaters, sewage or excremental matter from any water-closet, privy or cesspool shall be thrown, placed, led, conducted, or discharged by any pipe, drain or ditch into any reservoir or watercourse of the Corinth public water supply nor shall any such matter be thrown, placed, led, discharged or allowed to escape on to the surface of the ground or into the ground below the surface within three hundred (300) feet from any reservoir, or within two hundred (200) feet from any watercourse of the Corinth public water supply.

8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste water from creameries, cheese factories, laundries, nor water in which milk cans, utensils, clothes, bedding, carpets or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse of the Corinth public water supply. Nor shall any such liquid or solid refuse or waste be thrown or discharged upon the surface of the ground or into the ground below the surface in any manner whereby the same may flow into any reservoir or watercourse of the Corinth public water supply within one hundred (100) feet from any reservoir or watercourse of the Corinth public water supply.

9. No clothing, bedding, carpets, harness, vehicle, receptacle, utensils, nor anything that in any way or to any degree pollutes water shall be washed, rinsed or placed in any reservoir or watercourse of the Corinth public water supply.

BATHING, ANIMALS, MANURE, COMPOST, ETC.

10. No person shall be allowed to bathe in any reservoir or watercourse of the Corinth public water supply, nor shall any animals or poultry be allowed to stand, wade or swim in said reservoir or watercourse, nor to be washed therein.

11. No stable for cattle or horses, barnyard, hogpen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile nor compost heap shall be located, placed, maintained or allowed to remain with its nearest point less than one hundred and fifty (150) feet, horizontal measurement, from high water mark of any reservoir or less than seventy-five (75) feet from any watercourse of the Corinth public water supply, and none of the above named objects or sources of pollution shall be so located, placed, maintained or allowed to remain that the drainage, leachings, or washings from the same may enter any reservoir or watercourse of the Corinth public water supply, without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that proper purification has been secured unless the above drainage, leachings, or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred and fifty (150) feet before entering any reservoir nor less than seventy-five (75) feet before entering any watercourse of the Corinth public water supply.

12. No human excrement or compost containing human excrement shall be placed, piled or spread upon the ground, or dug or buried in the soil within a distance of three hundred (300) feet from any reservoir, nor within a distance of two hundred (200) feet from any watercourse of the Corinth public water supply, and no manure or compost of any kind shall be placed, piled or spread upon the ground within one hundred and fifty (150) feet from any reservoir nor within seventy-five (75) feet from any watercourse of the Corinth public water supply.

13. No decayed nor fermented fruit or vegetable, cider mill waste, roots, grain or other vegetable refuse of any kind shall be located, placed, maintained or allowed to remain in such places that the drainage, leachings, or washings therefrom may flow by

open, blind or covered drains or channels of any kind into any reservoir or watercourse of the Corinth public water supply nor may any such material or the drainage, leachings or washings therefrom percolate through the ground into any such reservoir or watercourse without first having passed over or through such an extent of soil as to have become properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred (100) feet before entering any reservoir or a distance of not less than fifty (50) feet before entering any watercourse of the Corinth public water supply.

DEAD ANIMALS, OFFAL, MANUFACTURING WASTE, ETC.

14. No dead animal, bird, fish or any part thereof, nor any offal nor refuse from any slaughter-house, nor any decomposable or putrescible refuse or waste matter of any kind shall be thrown, placed in, or allowed to pass into any reservoir or watercourse of the Corinth public water supply, nor shall any such material or refuse be so located, placed, maintained, or allowed to remain that the drainage, leachings or washings therefrom may reach any reservoir or watercourse of the Corinth public water supply without first having percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred and fifty (150) feet before entering any reservoir, and not less than one hundred (100) feet before entering any watercourse of the Corinth public water supply.

PENALTY.

15. In accordance with section seventy of chapter six hundred sixty-one (661) of the laws of 1893, as amended by chapter two hundred fifty-one of the laws of 1899, the penalty for each and every violation of, or noncompliance with, any of the above rules and regulations which relate to a permanent source or act of contamination is hereby fixed at two hundred dollars ($200).

The foregoing rules and regulations for the protection from contamination of the public water supply of the village of Corinth, N. Y., were duly made, ordained and established on October 4, 1904, pursuant to chapter six hundred sixty-one (661) of the laws of the State of New York for 1893, as amended by chapter two hundred fifty-one (251) of the laws of 1899, and by chapter twenty-nine of the laws of 1901.

DANIEL LEWIS,
State Commissioner of Health.

ALBANY, N. Y., *October* 4, 1904.

These rules and regulations, to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Saratoga county, N. Y., and the affidavit of the printer, publisher, or proprietor of the newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations must be filed with the county clerk.

The cost of such publications, affidavit and filing must be paid by the village authorities of Corinth, N. Y.

LITTLE FALLS WATER SUPPLY RULES.

Rules and Regulations for the Protection from Contamination of the Public Water Supply of the City of Little Falls, N. Y., enacted by the New York State Department of Health under Chapter 661 of the Laws of 1893, and Chapter 251 of the Laws of 1899.

Abstract of the Public Health Law providing for the protection from contamination of public water supplies. Chapter 661 of the laws of 1893 as amended by chapter 251 of the laws of 1899.

§ 70. The State Board of Health may make rules and regulations for the protection from contamination of any or all public supplies of potable waters and their sources within the State. If any such rule or regulation relates to a temporary source or act of contamination, any person violating such rule or regulation shall be liable to prosecution for misdemeanor for every such violation, and on conviction shall be punished by a fine not exceeding two hundred dollars, or imprisonment not exceeding one year, or both. If any such rule or regulation relates

to a permanent source or act of contamination, said board may impose penalties for the violation thereof or the noncompliance therewith, not exceeding two hundred dollars for every such violation or noncompliance. Every such rule or regulation shall be published at least once in each week for six consecutive weeks, in at least one newspaper of the county where the waters to which it relates are located. The cost of such publication shall be paid by the corporation or municipality benefited by the protection of the water supply, to which the rule or regulation published relates. The affidavit of the printer, publisher or proprietor of the newspaper in which such rule or regulation is published may be filed, with the rule or regulation published, in the county clerk's office of such county, and such affidavit and rule and regulation shall be conclusive evidence of such publication, and of all the facts therein stated in all courts and places.

§ 71. The officer or board having by law the management and control of the potable water supply of any municipality, or the corporation furnishing such supply, may make such inspection of the sources of such water supply, as such officer, board or corporation deems it advisable, and to ascertain whether the rules or regulations of the State board are complied with. If any such inspection discloses a violation of any such rule or regulation relating to a permanent source or act of contamination, such officer, board or corporation shall cause a copy of the rule or regulation violated to be served upon the person violating the same, with a notice of such violation. If the person served does not immediately comply with the rule or regulation violated, such officer, board or corporation shall notify the State board of the violation, which shall immediately examine into such violation; and if such person is found by the State board to have actually violated such rule or regulation, the secretary of the State board shall order the local board of health of such municipality to convene and enforce obedience to such rule or regulation. If the local board fails to enforce such order within ten days after its receipt, the corporation furnishing such water supply, or the municipality deriving its water supply from the waters to which such rule or regulation relates, may maintain an action in a court of record, which shall be tried in the county where the cause of action arose against such person, for the recovery of the penalties incurred

by such violation and for an injunction restraining him from the continued violation of such rule or regulation.

All rules and regulations heretofore duly made and published for the sanitary protection of public water supplies, pursuant to chapter five hundred and forty-three of the laws of eighteen hundred and eighty-five and chapter six hundred and sixty-one of the laws of eighteen hundred and ninety-three, as amended, are hereby legalized, ratified, confirmed and continued in force, until new rules and regulations become operative.

This act shall not be construed to repeal or affect any of the provisions of chapter three hundred and seventy-eight of the laws of eighteen hundred and ninety-seven, or its amendments.

§ 72. Sewerage.—When the State Board of Health shall, for the protection of a water supply from contamination, make orders or regulations the execution of which will require or make necessary the construction and maintenance of any system of sewerage, or a change thereof, in or for any village or hamlet, whether incorporated or unincorporated, or the execution of which will require the providing of some public means of removal or purification of sewage, the municipality or corporation owning the water-works benefited thereby shall, at its own expense, construct and maintain such system of sewerage, or change thereof, and provide such means of removal and purification of sewage and such works or means of sewage disposal as shall be approved by the State Board of Health. When the execution of any such regulations of the State Board of Health will occasion or require the removal of any building or buildings, the municipality or corporation owning the water-works benefited thereby shall, at its own expense, remove such buildings and pay to the owner thereof all damages occasioned by such removal. When the execution of any such regulation will injuriously affect any manufacturing or industrial enterprise which is not a public nuisance, such municipality or corporation shall pay all damages occasioned by the enforcement thereof. Until such construction or change of such system or systems of sewerage, and the providing of such means or removal or purification of sewage, and such works or means of sewage disposal and the removal of any building, are so made by the municipality or corporation owning the water-works to be benefited thereby at its own expense, there

shall be no action of proceeding taken by such municipality or corporation against any person or corporation for the violation of any regulation of the State Board of Health under this article, and no person or corporation shall be considered to have violated or refused to obey any such rule or regulation. The owner of any building the removal of which is occasioned or required, or which has been removed by any rule or regulation of the State Board of Health made under the provision of this article, and all persons whose rights of property are injuriously affected by the enforcement of any such rule or regulation, shall have a cause of action against the municipality or corporation owning the water-works benefited by the enforcement of such rule or regulation, for all damages occasioned or sustained by such removal or enforcement, and an action therefor may be brought against such municipality or corporation in any court of record in the county in which the property is situated. Such special proceedings shall be commenced by petition and notice to be served by such owner upon the municipality or corporation in the same manner as for the commencement of condemnation proceedings. Such municipality or corporation may make and serve an answer to such petition as in condemnation proceedings. The petition and answer shall set forth the claims of the respective parties, and the provisions of the condemnation law shall be applicable to the subsequent proceedings upon the petition and answer, if any. Either party may, before the service of the petition or answer respectively, offer to take or pay a certain sum, and no costs shall be awarded against either party unless the judgment is more unfavorable to him than his offer.

Section 2 of chapter 29 of the laws of 1901, which provides for the substitution of the State Department of Health for the State Board of Health, reads as follows:

Section 2. Whenever the term "State Board of Health" occurs or any reference is made thereto in any law, it shall be deemed to mean and refer to the "Department of Health" as created by this act. The Commissioner of Health shall have all the powers conferred and perform all the duties imposed by law upon the "State Board of Health," or any member, committee or officer thereof, including the secretary.

RULES AND REGULATIONS.

The following rules and regulations shall apply to the following reservoirs belonging to the public water supply of the city of Little Falls, N. Y., and to all lakes, ponds, streams and other watercourses tributary thereto: Beaver brook reservoir, Spruce creek reservoir, Klondike reservoir, and the distributing reservoir near the city of Little Falls. The term "reservoir" wherever used in these rules is intended to mean and comprise every natural or artificial reservoir, lake, or pond, which stores or detains water that enters or may enter the public water supply of the city of Little Falls. The term "watercourse" wherever used in these rules is intended to mean and comprise every spring, stream, ditch, gutter, or other watercourse of any kind, the waters of which when running, whether continuously or occasionally, eventually flow or may flow into either of the above-named reservoirs of the public water supply of the city of Little Falls, N. Y. Wherever distances from reservoirs or watercourses are mentioned they are intended to mean the horizontal distances from the highwater line of such reservoir or the edge, margin or precipitous bank forming the ordinary highwater mark of such watercourse.

PRIVIES ADJACENT TO RESERVOIRS OR WATERCOURSES.

1. No privy, privy vault, pit, cesspool, or any other receptacle of any kind used for either temporary storage or the permanent deposit of human excreta shall be constructed, placed or maintained with its nearest point within fifty (50) feet of any reservoir or watercourse of the Little Falls water supply.

2. No privy, privy vault, pit, cesspool or any other receptacle used for the permanent deposit of human excreta shall be constructed, located, placed or maintained with its nearest point within two hundred fifty (250) feet of any reservoir or watercourse of the Little Falls water supply. For points one mile or more distant up stream from the Beaver brook reservoir, Spruce creek reservoir, and Klondike reservoir, on tributaries thereto, the above restricted distances shall be one hundred fifty (150) feet, and for points four miles or more up stream from these reservoirs the restricting distance shall be fifty (50) feet.

3. Every privy, privy vault, pit, cesspool or other receptacle or place used for the temporary storage of human excreta which is constructed, located, or maintained within the aforesaid two hundred fifty (250) feet, one hundred fifty (150) feet, and fifty (50) feet, horizontal measurement, of the highwater mark of any reservoir or watercourse of the Little Falls water supply, from which privy or other receptacle the excreta are not at once removed automatically by means of suitable watertight pipes or conduits to some proper place of ultimate disposal, as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall at all times be maintained in an absolutely watertight condition and which will permit of convenient removal to some place of ultimate disposal as hereinafter set forth.

4. The excreta collected in the aforesaid receptacles shall be removed and the receptacles thoroughly cleansed and deodorized as often as may be found necessary in order to maintain the privy in proper sanitary condition and to effectually prevent any overflow upon the soil or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of disposal hereinafter specified, and that the contents, while being transferred from the privy to the place of disposal, shall be thoroughly covered and that the least possible annoyance and inconvenience be caused to occupants of the premises and the adjacent premises.

5. Unless otherwise specifically ordered or permitted by the State Commissioner of Health the excreta collected in the aforesaid receptacle shall, when removed, be disposed of by burying in trenches, or by thoroughly digging it into the soil in such place and manner as to effectually prevent them being washed over the surface of the ground by rain or melting snow, and at distances not less than three hundred (300) feet, horizontal measurement, from the highwater mark of any reservoir or not less than two hundred (200) feet from the edge margin or precipitous bank of any watercourse of the Little Falls water supply.

6. Whenever it shall be found that owing to the character of the soil or of the surface of the ground, or owing to the height

or flow of sub-soil, or surface water, or other special local conditions, the excremental matter, from any privy or aforesaid receptacle, or from any trench or place of disposal may in, the opinion of the State Commissioner of Health, be washed over the surface or through the soil into any reservoir or watercourse, then the said privy or such receptacle for excreta or the said trench or place of disposal shall, after due notice to the owner thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

SEWAGE, HOUSE SLOPS, SINK WASTE, ETC.

7. No house slops, bath water, sewage or excremental matter from any water-closet, privy, or cesspool shall be led, conducted, or discharged by any pipe, drain or ditch into any reservoir or watercourse of the Little Falls water supply nor shall any such matter be placed, led, discharged or allowed to escape onto the surface of the ground or into the ground below the surface within three hundred (300) feet, horizontal measurement, from the highwater mark of any reservoir, or within two hundred (200) feet, horizontal measurement, of the edge, margin or precipitous bank of any watercourse of the Little Falls water supply.

8. No garbage, putrescible matter, kitchen or sink waste, refuse or waste from creameries, cheese factories, laundries, nor waste water in which milk cans, utensils, clothes, bedding, carpets, or harnesses have been washed or rinsed, nor any polluted water or liquid of any kind shall be thrown or discharged directly or indirectly into any reservoir or watercourse of the Little Falls water supply. Nor shall any such liquid or solid refuse or waste be thrown or discharged upon the surface of the ground or into the ground below the surface in any manner whereby the same may percolate, leach or flow into any reservoir or watercourse of the Little Falls water supply within one hundred (100) feet, horizontal measurement, of the highwater line of any reservoir or any watercourse of the Little Falls water supply.

9. No clothing, bedding, carpets, harness, vehicle, receptacles, utensils, nor anything that pollutes water shall be washed, rinsed or placed in any reservoir or watercourse of the Little Falls water supply.

BATHING, ANIMALS, MANURE, COMPOST, ETC.

10. No person shall be allowed to bathe in any reservoir or watercourse of the Little Falls water supply, nor shall any animal or poultry be allowed to stand, wade, or swim in said reservoir or watercourse, nor to be washed therein. Points distant two miles or more up stream from the Beaver brook reservoir, Spruce creek reservoir and Klondike reservoir on tributaries thereof are exempt from this restriction.

11. No stable for cattle or horses, barnyard, hogpen, poultry house or yard, hitching place or standing place for horses or other animals, manure pile or compost heap shall be located, placed, maintained or allowed to remain with its nearest point less than one hundred fifty (150) feet, horizontal measurement, from highwater mark of any reservoir, or any watercourse of the Little Falls water supply, and none of the above named objects or sources of pollution shall be so located, placed, maintained, or allowed to remain that the drainage, leachings, or washings from the same may enter any reservoir or watercourse of the Little Falls water supply, without first having passed over or through such an extent of soil as to have been properly purified, and in no case shall it be deemed that, proper purification has been secured unless the above drainage, leachings or washings shall have percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred fifty (150) feet before entering any reservoir or watercourse of the Little Falls water supply. For points distant one mile or more up stream from Beaver brook reservoir, Spruce creek reservoir and Klondike reservoir on tributaries thereof this restricting distance shall be one hundred (100) feet for points four miles or more distant up stream from these reservoirs the restricting distance shall be fifty (50) feet.

12. No human excrement or compost containing human excrement shall be placed, piled or spread upon the ground, or dug or buried in the soil within a distance of three hundred (300) feet from the high-water line of any reservoir or watercourse of the Little Falls water supply.

13. No manure or compost of any kind shall be placed, piled or spread upon the ground within one hundred and fifty (150) feet of the high-water line of any reservoir or watercourse of the Little Falls water supply. For points one mile or more distant up stream from the Beaver Brook reservoir, Spruce Creek reservoir and Klondike reservoir on the tributaries thereof this restricting distance shall be one hundred (100) feet; and points four miles or more up stream from these reservoirs are exempt from this restriction.

14. No decayed or fermented fruit or vegetable, cider-mill waste, roots, grain or other vegetable refuse of any kind shall be located, placed, maintained or allowed to remain in such places that the drainage, leachings, or washings therefrom may flow by open, blind or covered drains or channels of any kind into any reservoir or watercourse of the Little Falls water supply without first having passed over or through such an extent of soil as to become properly purified, and in no case shall it be deemed that sufficient purification has been secured unless the above mentioned drainage, leachings or washings shall have percolated over or through the soil in a scattered dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than seventy-five (75) feet before entering any reservoir or watercourse of the Little Falls water supply. Points one mile or more distant up stream from the Beaver Brook reservoir, Spruce Creek reservoir and Klondike reservoir on tributaries thereof are exempt from this restriction.

DEAD ANIMALS, OFFAL, MANUFACTURING WASTE, ETC.

15. No dead animal, bird, fish or any part thereof, nor any offal nor refuse from any slaughter-house, nor any decomposible or putrescible refuse or waste matter of any kind shall be thrown, placed in, or allowed to pass into any reservoir or watercourse of the Little Falls water supply, nor shall any such material or refuse be so located, placed, maintained, or allowed to remain that the drainage, leachings or washings therefrom may reach any reservoir or watercourse of the Little Falls water supply without first having percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible

lines of drainage, for a distance of not less than one hundred and fifty (150) feet before entering any reservoir or watercourse of the Little Falls water supply. For points distant one mile or more up stream from the Beaver Brook reservoir, Spruce Creek reservoir and Klondike reservoir this restricting distance shall be one hundred (100) feet; and points four miles or more distant up stream from these reservoirs may have this restricting distance reduced to fifty (50) feet.

PENALTY.

16. In accordance with section seventy of chapter six hundred sixty-one (661) of the laws of 1893, as amended by chapter two hundred fifty-one (251) of the laws of 1899, the penalty for each and every violation of, or noncompliance with, any of the above rules and regulations which relate to a permanent source or act of contamination is hereby fixed at two hundred dollars ($200).

The foregoing rules and regulations for the protection from contamination of the public water supply of the city of Little Falls, N. Y., were duly made, ordained and established on September 10, 1904, pursuant to chapter six hundred sixty-one (661) of the laws of the State of New York for 1893, as amended by chapter two hundred fifty-one (251) of the laws of 1899 and by chapter 20 of the laws of 1904.

DANIEL LEWIS,
State Commissioner of Health.

ALBANY, N. Y., *September* 10, 1904.

These rules and regulations, to be operative and valid, must first be published at least once each week for six consecutive weeks in at least one newspaper in Herkimer county, N. Y., and the affidavit of the printer, publisher, or proprietor of the newspaper in which such publication is made, that the publication was so made, together with a copy of the rules and regulations must be filed with the county clerk.

The cost of such publication, affidavit, and filing must be paid by the city authorities of Little Falls.

YONKERS WATER SUPPLY RULES.

Rules and Regulations for the protection from Contamination of the Public Water Supply of the City of Yonkers, N. Y., enacted by the New York State Department of Health under Chapter 661 of the Laws of 1893, and Chapter 251 of the Laws of 1899.

Abstract of the Public Health Law providing for the protection from contamination of public water supplies. Chapter 661 of the laws of 1893, as amended by chapter 251 of the laws of 1899.

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§ 70. The State Board (Department) of Health may make rules and regulations for the protection from contamination of any or all public supplies of potable waters and their sources within the State. If any such rule or regulation relates to a temporary source or act of contamination, any person violating such rule or regulation shall be liable to prosecution for misdemeanor for every such violation, and on conviction shall be punished by a fine not exceeding two hundred dollars, or imprisonment not exceeding one year, or both. If any such rule or regulation relates to a permanent source or act of contamination, said board may impose penalties for the violation thereof or the noncompliance therewith, not exceeding two hundred dollars for every such violation or noncompliance. Every such rule or regulation shall be published at least once in each week for six consecutive weeks, in at least one newspaper of the county where the waters to which it relates are located. The cost of such publication shall be paid by the corporation or municipality benefited by the protection of the water supply, to which the rule or regulation published relates. The affidavit of the printer, publisher or proprietor of the newspaper in which such rule or regulation is published may be filed, with the rule or regulation published, in the county clerk's office of such county, and such affidavit and rule and regulation shall be conclusive evidence of such publication, and of all the facts therein stated in all courts and places.

§ 71. The officer or board having by law the management and control of the potable water supply of any municipality, or the corporation furnishing such supply, may make such inspection

of the sources of such water supply, as such officer, board or corporation deems it advisable, and to ascertain whether the rules or regulations of the State board are complied with. If any such inspection discloses a violation of any such rule or regulation relating to a permanent source or act of contamination, such officer, board or corporation shall cause a copy of the rule or regulation violated to be served upon the person violating the same, with a notice of such violation. If the person served does not immediately comply with the rule or regulation violated such officer, board or corporation shall notify the State board of the violation, which shall immediately examine into such violation; and if such person is found by the State board to have actually violated such rule or regulation, the secretary of the State board shall order the local board of health of such municipality to convene and enforce obedience to such rule or regulation. If the local board falls to enforce such order within ten days after its receipt, the corporation furnishing such water supply, or the municipality deriving its water supply from the waters to which such rule or regulation relates, may maintain an action in a court of record, which shall be tried in the county where the cause of action arose against such person, for the recovery of the penalties incurred by such violation, and for an injunction restraining him from the continued violation of such rule or regulation.

All rules and regulations heretofore duly made and published for the sanitary protection of public water supplies, pursuant to chapter five hundred and forty-three of the laws of eighteen hundren and eighty-five, and chapter six hundred and sixty-one of the laws of eighteen hundred and ninety-three, as amended, are hereby legalized, ratified, confirmed and continued in force, until new rules and regulations become operative.

This act shall not be construed to repeal or affect any of the provisions of chapter three hundred and seventy-eight, of the laws of eighteen hundred and ninety-seven, or its amendments.

§ 72. When the State Board (Department) of Health, shall, for the protection of a water supply from contamination, make orders or regulations, the execution of which will require or make necessary the construction and maintenance of any system of sewerage, or a change thereof, in or for any village or

hamlet, whether incorporated or unincorporated, or the execution of which will require the providing of some public means of removal or purification of sewage, the municipality or corporation owning the waterworks benefited thereby shall, at its own expense, construct and maintain such system of sewerage, or change thereof, and provide such means of removal and purification of sewage and such works or means of sewage disposal as shall be approved by the State Board (Department) of Health. When the execution of any such regulations of the State Board (Department) of Health will occasion or require the removal of any building or buildings, the municipality or corporation owning the waterworks benefited thereby shall, at its own expense, remove such buildings and pay to the owner thereof all damages occasioned by such removal. When the execution of any such regulation will injuriously affect any manufacturing or industrial enterprise which is not a public nuisance, such municipality or corporation shall pay all damages occasioned by the enforcement thereof. Until such construction or change of such system or systems of sewerage, and the providing of such means of removal or purification of sewage, and such works or means of sewage disposal and the removal of any building, are so made by the municipality or corporation owning the waterworks to be benefited thereby at its own expense, there shall be no action or proceeding taken by such municipality or corporation against any person or corporation for the violation of any regulation of the State Board (Department) of Health under this article, and no person or corporation shall be considered to have violated or refused to obey any such rule or regulation. The owner of any building the removal of which is occasioned or required, or which has been removed by any rule or regulation of the State Board (Department) of Health made under the provision of this article, and all persons whose rights of property are injuriously affected by the enforcement of any such rule or regulation, shall have a cause of action against the municipality or corporation owning the waterworks benefited by the enforcement of such rule or regulation, for all damages occasioned or sustained by such removal or enforcement, and an action therefore may be brought against such municipality or corporation in any court of record in the

county in which the premises or property affected is situated and shall be tried therein; or such damages may be determined by a special proceeding in the Supreme Court or the county court of the county in which the property is situated. Such special proceedings shall be commenced by petition and notice to be served by such owner upon the municipality or corporation in the same manner as for the commencement of condemnation proceedings. Such municipality or corporation may make and serve an answer to such petition as in condemnation proceedings. The petition and answer shall set forth the claims of the respective parties, and the provisions of the condemnation law shall be applicable to the subsequent proceedings upon the petition and answer, if any. Either party may, before the service of the petition or answer respectively, offer to take or pay a certain sum, and no costs shall be awarded against either party unless the judgment is more unfavorable to him than his offer.

Section 2 of chapter 29 of the laws of 1901, which provides for the substitution of the State Department of Health for the State Board of Health, reads as follows:

§ 2. Whenever the term "State Board of Health" occurs or any reference is made thereto in any law, it shall be deemed to mean and refer to the Department of Health as created by this act. The Commissioner of Health shall have all the powers conferred and perform all the duties imposed by law upon the "State Board" of Health, or any member, committee, or officer thereof, including the secretary.

RULES AND REGULATIONS.

These rules and regulations apply to the following streams constituting the source or sources of the public water supply of Yonkers, lying all in Westchester county, New York:

1. Grassy Sprain brook, including its sources down to the dam, forming the Grassy Sprain reservoir.

2. Sprain brook, from its sources down to the point where it is diverted into the Grassy Sprain brook, including the diversion channel from Sprain brook to the Grassy Sprain brook.

3. Nepperhan river, also known as the Saw Mill river, from its sources down to the intake of the recently constructed Yonkers filtration plant.

4. The low service distributing reservoir known as the Fortfield reservoir.

5. The small reservoir at the high service pumping-station on Lake avenue.

The term *"any reservoir"* wherever used in these rules is intended to mean and include the above-mentioned Grassy Sprain reservoir, Fortfield reservoir, and Lake Avenue reservoir. The term *"any watercourse"* wherever used in these rules is intended to mean and include the above-mentioned Grassy Sprain brook, Sprain brook, Nepperhan river, and every spring, stream, swamp, ditch, gutter, and other watercourse of every kind, the waters of which when running, whether continuously or occasionally, eventually flow or may flow into either of the above three streams, or into either of the above three reservoirs. Wherever distances from reservoirs or from watercourses are mentioned in these rules they are intended to mean the horizontal distances from the high-water line of such reservoir, or the edge, margin, or precipitous bank forming the ordinary highwater mark of such watercourse.

PRIVIES ADJACENT TO RESERVOIRS OR WATERCOURSES.

No privy, privy-vault, pit, cess-pool, or other receptacle of any kind, used for either the temporary storage or the permanent deposit of human excreta shall be constructed, placed or maintained, or allowed to remain, with its nearest point less than fifty feet (50), from any reservoir or watercourse of the Yonkers water supply.

2. No privy, privy-vault, pit, cess-pool, or other receptacle of any kind, used for the permanent deposit of human excreta shall be placed, constructed, or maintained, or allowed to remain with its nearest point less than two hundred (200) feet from any reservoir, or less than one hundred (100) feet from any watercourse, of the Yonkers water supply.

3. Every privy, privy-vault, pit, cess-pool or other receptacle of any kind, used for the temporary storage of human excreta, which is constructed, located or maintained or allowed to remain within the aforesaid two hundred feet from any reservoir, or

within the aforesaid one hundred feet from any watercourse of the Yonkers public water supply, from which privy or other receptacle the excreta are not at once removed automatically by means of suitable water-tight pipes or conduits to some proper place of ultimate disposal as hereinafter provided, shall be arranged in such manner that all such excreta shall be received temporarily in suitable vessels or receptacles which shall at all times be maintained in an absolutely water-tight condition and which shall permit of convenient removal to some place of ultimate disposal as hereinafter provided.

4. The excreta collected in the aforesaid receptacles shall be removed and the receptacle thoroughly cleansed and deodorized as often as may be found necessary in order to maintain the privy in proper sanitary condition, and to effectually prevent any overflow of such excreta upon or into the soil, or upon the foundations or floor of the privy. In effecting this removal the utmost care shall be exercised that none of the contents be allowed to escape while being transferred from the privy to the place of ultimate disposal as hereinafter provided, and that the contents while being transferred from the privy to the place of ultimate disposal shall be thoroughly covered and that the least possible annoyance and inconvenience shall be caused to the occupants of the premises and of adjacent premises.

5. Unless otherwise specifically ordered or permitted by the State Commissioner of Health, the excreta collected in the aforesaid receptacle shall, when removed, be disposed of by burying in trenches or by burying thoroughly in the soil in such place and manner as to effectually prevent them or any part of them or any drainage from them being washed over the surface of the ground by rain or melting snow or by the wash or flow from any watercourse, and at distances not less than three hundred (300) feet from any reservoir or watercourse of the Yonkers public water supply.

6. Whenever it shall be found that, owing to the character of the soil or of the surface of the ground, or owing to the height or flow of ground water or surface water, or other special local condition the excremental matter from any privy or aforesaid receptacle or from any trench or place of disposal may, in the opinion of the State Commissioner of Health, be washed over the sur-

face or through the soil in an imperfectly purified condition into any reservoir or watercourse of the public water supply of the city of Yonkers, then the said privy or receptacle for excreta, or the said trench or place of disposal shall, after due notice to the owner or occupant thereof, be removed to such greater distance or to such place as shall be considered safe and proper by the State Commissioner of Health.

SEWAGE, HOUSE SLOPS, SINK WASTE, ETC.

7. No excremental matter either solid or liquid, chamber slops, bath water, sewage from any watercloset, privy or cesspool, shall be thrown, placed or allowed to flow by any pipe, drain or ditch, into any reservoir or watercourse of the Yonkers public water supply, nor shall any such matter be thrown, placed, led, discharged, or allowed to flow or pass onto the surface of the ground or into the ground below the surface within two hundred (200') feet from any reservoir, or within one hundred fifty (150') feet from any watercourse of the Yonkers water supply. Whenever the ground is frozen and wherever the soil is hard or impervious, the above distances shall be increased to three hundred (300') feet and two hundred fifty (250') feet respectively. No excreta, either solid or liquid, from any person sick or convalescent with typhoid fever shall be thrown, placed, discharged or allowed to flow or pass by any sewer, pipe, drain or ditch, into any reservoir or watercourse of the Yonkers public water supply, nor onto the surface of the ground within a distance of four hundred (400') feet from any reservoir or watercourse, nor into the soil below the surface within the same distance except that if buried in trenches or pits and thoroughly covered with fresh clean soil to a depth of nine inches, the limiting distance shall be three hundred (300') feet from any such reservoir or watercourse.

8. No garbage, kitchen or sink waste, laundry water, wash water, refuse or waste water from any creamery, cheese factory, nor putrescible matter of any kind, nor any refuse or manufacturing waste of any kind, nor any polluted water of any kind shall be placed, led, thrown, discharged, or allowed to flow or pass into any reservoir or watercourse of the Yonkers public water supply, nor onto the surface of the ground nor into the

soil unless the same shall, from such place of discharge, flow or percolate through the soil for a distance of at least one hundred (100) feet before entering any reservoir, or of sixty (60) feet before entering any watercourse of the Yonkers public water supply.

WASHING, RINSING, ETC.

9. No clothing, bedding, carpets, harness, vehicles, receptacles, utensils, nor anything that in any way or to any degree pollutes or tends to pollute water, shall be washed, rinsed, or placed in any reservoir or watercourse of the Yonkers public water supply.

BATHING, ANIMALS, MANURE, COMPOST, ETC.

10. No person shall be allowed to bathe in any reservoir or watercourse of the Yonkers public water supply, nor shall any animals or poultry be allowed to swim, wade or stand in any said reservoir nor in any said watercourse within four miles, as the stream flows, of the intake of the filtration works on the Nepperhan river, nor within six miles, as the stream flows, of the dam of the Grassy Sprain brook. But this shall not be construed to prohibit animals and poultry from being watered from any portion of the watercourses of the Yonkers public water supply, distant at least one mile, as the streams flow, from the intake of the filtration plant on Nepperhan river, or from the Grassy Sprain brook dam, provided, that such watering shall only be permitted at definite watering places properly fenced, so that the animals or poultry cannot stand in the water, and with the banks at such places properly paved so as to prevent them from becoming mired and muddy.

11. No stables for horses or cattle, barnyard, hogpen, poultry yard, hitching or standing place for horses or animals, manure pile or compost heap, shall be located, placed, maintained, or allowed to remain with its nearest point less than one hundred (100) feet from any reservoir, or less than fifty (50) feet from any watercourse, except as provided for watering places under rule 10 above. But this shall not prohibit the keeping of manure under cover and protected from the wash of surface water, provided such be at least seventy-five (75) feet from any

reservoir and at least twenty-five (25) feet from any watercourse of the Yonkers public water supply.

12. No human excrement nor compost containing the same shall be placed, piled or spread upon the ground, nor dug or buried in the soil or ground within a distance prohibited by rule 7 of these rules and regulations, and the provisions of that article shall apply to this one.

13. No manure or compost of any kind shall be placed, piled or spread upon the ground, within a distance of one hundred (100) feet from any reservoir or within a distance of fifty (50) feet from any watercourse of the Yonkers public water supply, provided that if the said manure or compost is at once thoroughly dug or plowed into the soil and not allowed to remain on the surface of the ground, the limiting distance from any watercourse shall be thirty (30) feet in place of fifty (50) feet as above. These limiting distances from watercourses shall be reduced ten (10) feet for each mile of distance, upstream, as the streams flow, from the intake of the filtration plant on the Nepperhan river, and from the dam of the Grassy Sprain reservoir on the Grassy Sprain brook and on the Sprain brook.

14. No decayed or fermented fruit or vegetables, roots, grain, cidermill waste, or other vegetable refuse of any kind shall be thrown, placed, maintained, or allowed to remain within one hundred (100) feet of any reservoir or within fifty (50) feet of any watercourse of the Yonkers public water supply, nor in such place that the washings or drainage therefrom may not percolate through the soil or over the surface of the ground in a dissipated, scattered form and not concentrated in perceptible lines of drainage, for a distance of at least one hundred (100) feet before entering any reservoir, or fifty feet before entering any watercourse of the Yonkers water supply.

DEAD ANIMALS, OFFAL, ANIMAL WASTE, ETC.

15. No dead animal, bird, fish or any part thereof, nor any offal nor slaughter-house matter or refuse, nor any decomposable matter of any kind shall be thrown, placed, discharged, or allowed to pass into any reservoir or watercourse of the Yonkers public water supply, nor shall any such material of any kind be placed, maintained, or allowed to remain so that the drainage, leachings or washings therefrom may reach any

reservoir or watercourse of the Yonkers public water supply, without first having percolated over or through the soil in a scattered, dissipated form, and not concentrated in perceptible lines of drainage, for a distance of not less than one hundred and fifty (150) feet before entering any reservoir, and not less than one hundred (100) feet before entering any watercourse of the Yonkers public water supply.

RESERVOIRS, FILTRATION PLANT, ETC.

16. The water department of the city of Yonkers shall maintain the reservoirs of the city in a thoroughly clean condition and for this purpose shall remove from the same, at regular and frequent intervals, all accumulations of foreign matter, vegetable growths, and maintain a systematic and regular inspection of the said reservoirs.

It shall also erect and maintain substantial and impassible barriers or fences entirely surrounding each reservoir and shall exclude all persons not connected with the department from access to the same except for proper purposes.

The water department shall provide for and maintain a systematic plan of cleaning its filtration plant in accordance with regulations to be recommended by the engineer under whose direction the plant was constructed.

INSPECTION.

17. The water department of the city of Yonkers shall maintain a systematic inspection of the entire watershed of the several water sources forming its water supply, as provided for under section seventy-one (71) of the Public Health Law, and at intervals between inspections not longer than one month, and shall enforce these regulations in accordance with the said section.

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18. In accordance with section seventy (70) of chapter six hundred and sixty-one (661) of the laws of 1893, as amended by chapter two hundred and fifty-one (251) of the laws of 1899, the penalty for each and every violation of, or noncompliance with, any of the above rules and regulations which relates to a permanent source or act of contamination is hereby fixed at two hundred dollars ($200).

The foregoing rules and regulations for the protection from contamination of the public water supply of the city of Yonkers, N. Y., are hereby duly made, ordained and established on this twenty-ninth day of November, nineteen hundred and four, pursuant to chapter six hundred and sixty-one of the laws of the State of New York, of eighteen hundred and ninety-three, as amended by chapter two hundred and fifty-one of the laws of the State of New York for eighteen hundred and ninety-nine, and by chapter twenty-nine of the laws of nineteen hundred and one.

DANIEL LEWIS,
State Commissioner of Health.

ALBANY, N. Y., *November* 29, 1904.

EXAMINATIONS OF WATER SUPPLIES AND SEWAGE DISPOSAL FOR STATE INSTITUTIONS.

ALBANY, N. Y., *April* 14, 1904.

Dr. DANIEL LEWIS, *Commissioner of Health:*

Dear Sir:—We propose to establish a new water supply for the Rochester State Hospital from springs on the hospital property. Will you please let me know whether in your judgment these springs are a suitable source for general domestic purposes, and also whether the water would be soft enough for use in the boilers. If the water needs to be filtered will you please let me know what kind of filter should be used.

Very truly yours,

G. L. HEINS,
State Architect.

NEW YORK CITY, *May* 17, 1904.

Hon. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—Under your instructions I visited on April 25th, the Rochester State Hospital with reference to the proposition for a change in the method of water supply.

The hospital now takes its supply from the Hemlock lake conduit of the city of Rochester, which passes through the hospital grounds.

The annual consumption is very regular. For the year ending September 30, 1896, it was 20,865,416 gallons. For the year ending September 30, 1903, it was 22,440,000 gallons, or 61,500 gallons per day. The cost of this to the hospital was 3,000,000 cubic feet at $1.05 per 1,000, $3,150.

This is good soft water, potable and fitted for cooking and boiler uses.

On some property recently acquired by the hospital, about a mile from the institution and at a much lower elevation (150 feet, I believe), there are several wells bored through clay and rock into a water-bearing limestone stratum. They are cased with six inch pipe for 62 feet below the surface and the water rises in them and overflows at an elevation of four feet above the surface of the ground, supplying a small reservoir from which ice is cut in the winter.

These wells were driven about eleven years ago by a company which proposed to furnish water to the city from them and did actually furnish water from December 31, 1893, to October 4, 1894, or 305 days. The average supply furnished was 778,000 gallons per day. This was rather more than the wells were capable of yielding and the daily supply was less than this for the latter portion of the time. The supply was discontinued because the city obtained water elsewhere.

It has now been suggested that the hospital utilize this source of supply for general purposes, with the idea that the cost will be less than that of purchasing water from the city.

Samples of the water from the wells were taken by me and have been examined by Dr. Tucker and Dr. Pearce. (Result of analysis given in reports of Bureau of Chemistry and Bureau of Pathology and Bacteriology, published elsewhere).

Biologically, the water is very pure. Chemically it is pure and wholesome, but it is so hard that it is not fit for use for household and boiler purposes. It could only be used for watering the grounds and such washing as did not call for the use of soap.

To utilize the wells in the manner proposed would require the construction of some sort of pumping plant, capable of lifting 20,000 gallons an hour about 200 feet, a steel tank of about 200,000 gallons capacity, the laying of probably two miles of cast iron pipe and the adjustment of the connections with the present distribution system so that the city water could be used at the laundries, boiler houses, etc., without interfering with the well supply. For the pumping, it is probable that the air-lift system might be used to advantage, the plant being located in the present boiler house, which is three-quarters of a mile from the wells and about 70 feet above them.

No comparison can be made between the cost of installing and operating such an additional plant and that of taking an increased supply from the city water works, without first obtaining carefully prepared estimates from contractors, but I question very much the expediency of the institution entering upon an enterprise involving not only the outlay necessary for this work, but also constant expert supervision and maintenance, when so good a supply of water can be maintained from the city water works at what appears to me a reasonable cost.

Respectfully submitted.

J. J. R. CROES,
Consulting Engineer.

ALBANY, N. Y., *May* 24, 1904.

Mr. G. L. HEINS, *State Architect, Capitol, Albany, N. Y.:*

Dear Sir:—I enclose herewith, a copy of a report made to me by Mr. J. J. R. Croes, covering his investigation as to a proposed new source of water supply for the Rochester State Hospital.

In view of the conclusions of Mr. Croes as to the probable expense attending the installing and operating of an additional plant, and taking into consideration the quality of water to be secured from wells on the ground, I would recommend that the additional supply of water needed for the use of the institution be provided for from the Hemlock lake conduit or the city of Rochester supply as is now done.

Very respectfully,

DANIEL LEWIS,
Commissioner of Health.

AABANY, N. Y., *June* 17, 1904.

Hon. DANIEL LEWIS, M. D., *State Commissioner of Health:*

Dear Sir:—In connection with your letter of the 24th of May enclosing report of Mr. J. J. R. Croes concerning the water supply at Rochester State Hospital, I would like to discuss the matter with you as follows:

The institution now pays a little over $3,000 a year for water supply. When the new buildings are put in commission, probably about twice as much water will be needed, and I think that $6,000 will barely cover the cost per year for water for the entire hospital. Some time ago, the institution acquired the property upon which the artesian wells in question are located. They proceeded to build an ice-pond, and have made quite a saving by cutting their own ice, the artesion wells supplying the pond. I know very well that the water is hard and very hard, but it is pure. For some years the institution has been considering the possibility of installing an air-lift plant to lift this water from the wells into a stand-pipe and supplying the institution from this source. The powerhouse has been designed with this special end in view as regards the pump-pit, or the room where the compressors are to be installed. I have practically completed plans and specifications for the installation of this water supply plant, which includes briefly the following:

A stand-pipe or water tower located on the grounds at the highest point.

Air compressors in the powerhouse.

An air line to the wells.

Separators or other patent apparatus at the wells to lift the water directly into the stand-pipe.

A connection from the stand-pipe into the regular water mains with a check valve in it, so that in case the connections with the city mains are open the full city pressure will be put upon the pipe lines for fire purposes, thus giving them a higher pressure and an inexhaustible supply without in any way mixing the water from the wells with that in the city mains. Mr. Manning, one of my engineers, has visited the water commissioners and city engineers at Rochester in company with the superintendent, and arranged all the details of this plant, which will of course be submitted to them before it is finally adopted.

The plant in question does not contemplate using the well water of the institution in the laundry or for the boilers. A very simple arrangement leaves the city water in connection with these two buildings.

Of course, in spite of the fact that the institution pays a large amount for water, they still have to be very economical in its use, whereas with their own water supply installed they could get untold benefit from having a copious supply for irrigation purposes available at all times at their hydrants and still-cocks.

The installation of the air-lift is no new proposition, as the State Hospital at Kings Park is now operated by one, as well as that of Gowanda; also there are numerous other instances of similar installations. Considering the matter as a whole, the authorities are all agreed that it would be a highly desirable plan to have this water supply plant installed. Your engineer states that the water is biologically pure, and as it is not the intention to use it in the laundry or the boilers, and as we have arranged a system for collecting the storm water drainage from the roofs in cisterns, in order to get a supply of soft water, I am of the opinion that we should proceed with the installation of a separate water plant. It is very important that this matter be settled at once, as the contractor for the plumbing of the new building is now going ahead with all his piping, which will be affected somewhat by this installation.

Will you kindly advise me as to whether the above considerations would influence your opinion as to the use of this water.

Yours very truly,

G. L. HEINS,
State Architect.

Albany, N. Y., *June* 27, 1904.

Mr. G. L. Heins, *State Architect, Albany, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 17th inst., concerning the plan proposed for increasing the water supply of the Rochester State Hospital.

In view of your full explanation of the matter I take pleasure in stating that this Department will enter no objection to the plan proposed by you.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *July* 1, 1904.

DANIEL LEWIS, M. D., *State Department of Health:*

Dear Sir:—I have to thank you for your letter of the 27th inst., withdrawing objections to the installation of a water plant at Rochester State Hospital. I will proceed with the design of this work.

Very truly yours,
G. L. HEINS,
State Architect.

ALBANY, N. Y., *September* 22, 1904.

Dr. JOHN H. PRYOR, *Superintendent Raybrook Hospital, Raybrook, N. Y.:*

Dear Sir.—I am sending to you to-day under a separate cover, two sterilized water bottles, and would be pleased to have you send me a specimen of sewage for bacteriological and chemical analyses, the sample to be taken after it leaves the tank.

Please forward the specimen for bacteriological examination to Dr. R. M. Pearce, Bender Laboratory, Albany, N. Y., and that for chemical analysis to Prof. Willis G. Tucker, Albany Medical College, Albany, N. Y.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *October* 1, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, Albany, N. Y.:*

Dear Sir:—Following is the report on the specimen of filtered sewage received from Dr. J. H. Pryor, superintendent of the State Hospital for Tuberculosis, Raybrook, N. Y. Specimen dated September 25th; received September 26th; analysis started September 28th.

There were no colon tests made upon this specimen. Agar

plates showed about 400,000 organisms per cubic centimeter. Gelatin plates were liquefied with a strong putrefactive and ammoniacal odor.

Respectfully submitted,

R. M. PEARCE,
Director.

ALBANY, N. Y., *October* 3, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith report in duplicate on the analysis of a sample of sewage from the Raybrook Hospital received by your order on September 28, 1904. No particulars concerning the sample other than those supplied upon the label and noted in the report were received and I am therefore unable to construe the results or give an opinion concerning them, and, indeed, have not been requested to do so. I may say, however, that in some respects the sewage is peculiar. The chlorine is very low and albuminoid ammonia, nitrogen in nitrates, total solids and mineral matter, are also low for ordinary sewage, while oxygen consumed and free ammonia are fairly high. Nitrogen in nitrates is absent as is not infrequently the case in recent sewage. But the results may more intelligently be construed by those familiar with the origin and treatment, if any, which this sewage has received.

Very respectfully yours,

W. G. TUCKER,
Director.

Analysis of Sewage.

(Results are parts in 100,000.)

Received from Dr. J. H. Pryor, superintendent Raybrook State Hospital for Tuberculosis. Date received, September 28, 1904; how labeled: "Taken from point at which sewage runs out of ground after passing through sand bank, Tuesday, September 27, 3 p. m.;" appearance: color, milky, opalescent; turbidity, opaque; sediment, decided, whitish; odor at 100 degrees F, highly offensive; chlorine in chlorides, 1.30; free ammonia, 1.4575; albuminoid ammonia, 0.2850; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0136; oxygen consumed, 4.3660; total solids, 31.80; loss on ignition, 23.20; behavior during ignition, blackened and evolved disagreeable odor; mineral matter, 8.60. Remarks: see accompanying letter.

W. G. TUCKER,
Director.

October 3, 1904.

ALBANY, N. Y., *October* 8, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—In conformity with your instructions I wrote to Dr. Pryor, superintendent of the Raybrook Hispital, inquiring as to the treatment of sewage, or accidental introduction of antiseptic agents into the same, and I have just received from him a reply which I enclose herewith.

Without inspection of the plant, or further and fuller information concerning it, I am unable particularly to advise in the matter, but it is evident that such sewage as that sent to me for examination and already reported upon to you, is unfit to add directly to any natural water course in any considerable volume if such water is used by the others for domestic purposes.

Very respectfully yours,

W. G. TUCKER,

Director.

RAYBROOK, ESSEX COUNTY, N. Y., *October* 6, 1904.

Dr. WILLIS G. TUCKER, *New York State Department of Health, Albany, N. Y.:*

Dear Sir:—In reply to your letter of October 5th, I hasten to inform you that no germicidal or antiseptic agents of any kind are used in this institution nor do I know of any way such antiseptics could gain access to the sewage. There is nothing in the sewage which interferes with or retards bacterial action and prevents the decomposition of organic matter. It must be due to the fact that the plant does not work properly, which is exactly my suspicion. I do not believe that the work has been efficiently done and shall be glad to receive your report at the earliest possible opportunity. I am particularly anxious to know if this sewage is dangerous to any parties who may take their water supply from Raybrook in which this fluid flows. Our remedy is better filter beds, but I do not wish to move until I receive your report. Will you kindly hasten it as much as possible.

Very truly yours,

JOHN H. PRYOR, M. D.,

Superintendent.

ALBANY, N. Y., *October* 12, 1904.

Prof. O. H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I enclose herewith papers and correspondence on the lubject of the sewage disposal plant at Raybrook.

In view of the results of the chemical and bacteriological examinations of specimens of the filtered sewage, as well as the statement made by Dr. Pryor, you are requested to inspect the plant and report the result to me at your earliest convenience.

Kindly return all the enclosed papers with your report.

Very respectfully,

DANIEL LEWIS,
Commissioner of Health.

SCHENECTADY, N. Y., *October* 17, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir.—Agreeable to your letter of October 12th, transmitting certain papers and correspondence on the subject of the sewage disposal plant at the State Tuberculosis Hospital at Raybrook, N. Y., I write to say that I visited the institution on the 15th inst., and made an examination of the sewage disposal plant which has been constructed there.

I found that the disposal system as now constructed comprises only a small septic tank, from which three or four lines of porous tile pipe are laid, apparently for the purpose of permitting the effluent from the septic tank to percolate into the soil. There is no provision by which the effluent is discharged to or through these lines of pipe intermittently but is obliged to flow continuously. I found that only one of these lines of pipe was flowing to any appreciable extent and that one was flowing because the effluent had broken out of the pipe and forced its way to the surface of the ground, at a short distance from the septic tank and was flowing over the surface of the ground to the nearest brook. No other supplementary treatment following the septic tank is provided except this sub-soil percolation which appears to have been expected.

No samples were taken for chemical or biological analyses, but from my examination it appeared that the sewage was undergoing little or no actual purification and even imperfect liquefaction. The material flowing from the tank was far from being a satisfactory septic tank effluent, and was receiving no subsequent purification whatever by its flow through the short length of pipe, as was natural to expect. If it was expected that the effluent would soak away into the soil surrounding the lines of pipe, that expectation was not being realized.

The conditions surrounding the place where the sewage had broken out and appeared at the surface of the ground and along its course to the stream and down the stream as far as examined, were extremely unsanitary, objectionable and clearly constituted

a sanitary nuisance. Such conditions should not be tolerated in the vicinity of any village or public institution, much less a public sanitarium. The close proximity of the point of outbreak of the sewage and its exposed flow to the institution itself makes it extremely desirable that the condition should be abated without delay.

From the standpoint of the character of the stream rather than that of the sanitarium the conditions are hardly more favorable; not only does the discharge of sewage into the stream render it extremely obnoxious for some distance, but it must evidently leave the waters of the stream absolutely unsafe for use for any potable purposes whatever. The character of the institution being one for the treatment of an infectious disease renders the risk of a dangerous type of stream-infection far greater than for an equal volume of sewage from a normally healthy population.

I beg to recommend that the matter be brought to the attention of the proper officials with directions that the conditions be at once rectified.

The correspondence and copies of chemical and biological examinations submitted to me are herewith returned.

I am, dear sir,

Very truly yours,
OLIN H. LANDRETH,
Consulting Engineer.

ALBANY, N. Y., *January* 12, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I enclose herewith for your information, replies to questions submitted by you in connection with the sewage disposal plant at Craig Colony.

Kindly submit the report on the plans now in your hands at your earliest convenience.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

SONYEA, N. Y., *January* 9, 1904.

Hon. GEORGE L. HEINS, *State Architect, The Capitol, Albany, N. Y.:*

Dear Sir:—I have your letter of January 8th, containing six questions relative to the sewerage system at the Colony, answers to which are wanted by Dr. Daniel Lewis, State Commissioner of Health:

"Q. Is crude sewage to be sent to the beds, or has the sewage already received some preliminary treatment?

A. The sewage receives some preliminary treatment before it goes on the bed; it is passed through a screening tank.

Q. What is the composition of the sewage as to the pressure of surface water, roof water or ground water?

A. I presume the word "pressure" here is intended for "presence." There is no surface water, roof water, or ground water in the sewage when it flows on the surface of the beds.

Q. What quantity of sewage per day is to be sent to the new bed, No. 3?

A. When bed No. 3 is built, there will be 3 beds, each one acre in extent. Each acre is supposed to care for the sewage from 500 persons. As a matter of fact, they will do more than that. Bed No. 1 effectively cared for the sewage for nearly 700 persons for two or three years, and is in apparently as good condition now as it was when it was first built. The sewage is turned alternately on different beds. It will flow on bed No. 1 for a day or so, then be turned on bed No. 2, then on bed No. 3, this rotation going on constantly. The amount of sewage now discharged on the beds is in the neighborhood of 45,000 to 50,000 gallons per day. The present system that uses two beds, is entirely satisfactory in every respect.

Q. What is the distribution of the sewage? Is it a uniform flow continually, or a uniform flow for interrupted periods, or a sudden discharge, and if so, at what intervals?

A. The sewage flows onto the beds intermittently, after a certain quantity has collected in the tank below the screening-house, where it releases itself and flows onto the beds about twice a day.

Q. What is the grade allowed to the four-inch subsoil drains?

A. My impression is that a foot of fall is in this drain from the east to west side of the bed.

Q. How near is the new bed to the nearest habitation, buildings or road?

A. The sewage bed plant lies on the Colony flat lands, several hundred yards distant from any building. In the eight years of its operation, there has never been any complaint from any odor or anything else of a disagreeable nature emanating from any part of the sewage system."

Very respectfully,

WILLIAM P. SPRATLING,

Medical Superintendent.

SCHENECTADY, N. Y., *January* 16, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I beg to submit the following report of my examination of the plans for the additional filter bed No. 3 proposed to be added to the sewage disposal plant at Craig Colony, Sonyea, N. Y., the plans and specifications for which, prepared by the State Architect, you sent me for examination under date of December 28th.

As neither the plans nor the specifications gave all the information necessary on which to judge of the suitability of the proposed additional filter bed I asked through your office for additional facts and information, and this additional information, furnished by Dr. W. P. Spratling, medical superintendent of the colony, in a letter addressed to Hon. George L. Heins, State Architect, you transmitted to me on January 12th.

From my examination of all the information at hand, but not having made a personal inspection of the local conditions at the site of the disposal works, I am of the opinion that the plan in general is satisfactory. I have, however, to suggest two slight modifications:

First. A greater depth of filtering material than that stipulated would, in my opinion, tend to secure a greater permanency of action of the bed. Although the greater part of the purifying action is accomplished in the upper foot or so of the filtering material, the thoroughness of aeration of this upper active strata depends upon the amount of air which will be drawn down through it as the sewage settles and disappears through the drains; and this in turn is greater, the greater the depth of settlement to the drains. I would suggest, therefore, the addition of six inches or if possible one foot to the present proposed average depth of two feet.

Second.—The plans submitted show the proposed upper surface of the filtering material to be a true plane sloping down in about the direction of the short diagonal of the rhomboidal bed, the fall along this diagonal being 1.5 feet. The two distributing pipes bringing sewage to this bed are placed along one of the two upper edges, and the tendency will be for the sewage from each of these outlets to flow directly down the line of steepest slope which will be approximately parallel with the short diagonal and to collect in the lower portion of the bed; the filtering material in this portion would therefore receive more than its proper proportion of sewage to be purified while the soil in the opposite and upper portion of the bed, except where the flow from the distributing pipe crosses it, would receive less than its proper proportion. Unless the filtering material is abnormally porous it would seem that less difference of elevation between the lower and the higher corners of the field would be preferable and that in any case the surface be changed

from that of a true plane to that of a very flat cone or more proportionally since there are two outlets, a combination of two cones so that the sewage entering the field from each distributing pipe should have an equal tendency to flow in all directions and, thus tend to cover the field more uniformly than if the surface were a plane. This uniform distribution can also be secured by retaining the plane form and running close trenches north and south covering the entire bed, with main heading-trenches along the north and south enbankments. This would thus also provide for winter, the ridges of the trenches holding up the ice above the running trenches.

The proper amount of total fall across the bed, however, depends entirely on the porosity of the filtering material and as I have not seen this I am unable to do more than suggest a close attention to the matter by the designer. I beg to recommend that the plan be approved and that the suggestion be made to the State Architect to have some further consideration given to these two points.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

ALBANY, N. Y., *January* 21, 1904.

Hon. G. L. HEINS, *State Architect, Albany, N. Y.:*

Dear Sir:—I enclose herewith, with my approval, plan and specifications of an additional filter bed proposed to be added to the sewage disposal plant at Craig Colony.

In connection with this subject, I enclose a copy of the report made by Prof. Olin H. Landreth, calling attention to suggestions as to certain modifications of the proposed addition.

Kindly furnish this Department with a copy of the plan either on tracing cloth or a black and white print for use in reproducing same for our annual report.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

ROCHESTER, *June* 8, 1904.

Hon. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I am directed by the Board of Managers of the State Industrial School to present for your approval specifications and drawings for sewage disposal for the new institution, which is

to be built upon a tract of 1,400 acres in the town of Rush. That the situation may be clearly understood, I desire to state that the 750 boys of the institution are to be housed in cottages, which shall contain not to exceed 25 boys each, where they will live in charge of a master and matron, constituting thereby, as nearly as can be, a family. These cottages will not be closely associated, but will be distributed over the entire 1,400 acres, the larger proportion of them being each located upon a 50 acre farm. Four hundred feet will be the least distance between any two cottages, and they will be as much further removed than that as the exigencies of the situation will allow. An effective, inexpensive method of sewage disposal, that will meet the requirements of the situation, is required.

Yours very respectfully,
F. H. BRIGGS,
Superintendent.

SPECIFICATION FOR SEWAGE DISPOSAL AT INDIVIDUAL COTTAGES, STATE INDUSTRIAL SCHOOL.

Receiving tanks of sufficient capacity to contain 12 hours' sewage are to be provided for each cottage. Dimensions and construction shown on accompanying blue print. Receiving tank to be made of Portland cement, plastered on the inside, to be located at least 50 feet from the cottage. Receiving chamber to siphon into man-hole chamber through a 6 inch siphon; the man-hole chamber to discharge through an 8 inch vitrified tile sewer which shall connect through tees looking downward with ells connected with 4 inch farm drain tile laid 10 inches below the surface, as shown on blue print drawings attached hereto. Capacity of the 4 inch drain tile being equal to the capacity of the receiving tank. Running at right angles to the 4 inch drain tile above mentioned, and three feet below the surface, are to be constructed 4 inch tile drains, which, in turn, shall connect with the 6 inch vitrified sewer pipe drain, which shall discharge either into the river or open water courses not less than 600 feet from any occupied dwelling.

The upper set of drains to have a fall of not more than 2 inches per 100 feet; the lower set to have a fall of 1 inch for each 16 feet. The 8 inch vitrified sewer pipe to have all joints cemented.

Albany, N. Y., *June* 23, 1904.

Mr. G. L. Heins, *State Architect, Albany, N. Y.:*

Dear Sir:—I send to you by bearer, plans and specifications of the proposed sewage disposal plant to be constructed at the Rochester State Industrial School, same having been presented to this Department for approval through the superintendent, Mr. Franklin H. Briggs, whose letter of transmittal is also sent to you.

Before acting on the plans I would be pleased to have you inform me whether they meet with the approval of your Department.

Kindly return the plans and papers with your reply.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

Albany, N. Y., *July* 8, 1904.

Dr. Daniel Lewis, *State Commissioner of Health:*

Dear Sir.—In reply to your note of June 23rd, I return the drawings and letter from the State Industrial School. I am prepared to approve this provided it meets with your approval. It is necessary to have some sort of sewage disposal at the new site, and we have as yet no appropriation for a general sewage disposal plant.

We may some time install a general sewage plant, but this is probably in the distant future.

Yours very truly,
G. L. HEINS.

Albany, N. Y., *July* 15, 1904.

Prof. Olin H. Landreth, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I enclose herewith for examination and report by you, plans and specifications of a proposed system of sewage disposal for the State Industrial School at Rochester, together with a letter of transmittal form the superintendent of the institution, Mr. F. H. Briggs.

The papers when received were submitted by us to the State Architect, who makes the following statement:

"I am prepared to approve this, provided it meets with your approval. It is necessary to have some sort of sewage disposal at the new site, and we have as yet no appropriation for a general

sewage disposal plant. We may some time install a general sewage disposal plant, but this is probably in the distant future."

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

SCHENECTADY, N. Y., *September* 13, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—While recently engaged on the Seneca Lake matter I visited Rochester for the purpose of consulting with the authorities of the State Industrial School concerning the plans for proposed sewage disposal systems for their colony of cottages in the town of Rush, twelve miles south of Rochester.

On receiving further information and explanation concerning the proposed system from the superintendent, Mr. F. H. Briggs, I found them so defective as to preclude my recommendation of their approval. I explained the defects to Mr. Briggs and he stated that he would have them rectified, and again submitted to you.

The plans together with Mr. Briggs' letter of June 8th and the specifications attached to the plans are herewith returned. I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

ALBANY, N. Y., *September* 14, 1904.

Mr. F. H. BRIGGS, *Superintendent State Industrial School, Rochester, N. Y.:*

Dear Sir:—I enclose herewith, the plans and specifications of a proposed sewage disposal plant for the State Industrial School at Rochester.

Prof. Landreth informs me that he explained to you certain defects in the proposed system which should be remedied.

When amended plans and specifications are received from you they will receive prompt consideration.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

SCHENECTADY, N. Y., *September* 22, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—In the matter of the plans for the sewage disposal system for the cottages of the Rush colony of the New York State Industrial School of Rochester, N. Y., I beg to state that the re-

vised plans have been received and examined by me, but I regret to say that they are hardly in form for approval, for the following reasons:

1. The revised set contains but one drawing and no report or specification. The drawing sent is that for the tank and discharging siphon. There should be a block plan showing the location of each cottage that is to be served by a separate tank, and profiles of the lines from the discharging siphons to the sub-soil tiling, and a topographical map of the ground proposed for tiling with profiles or at least the depths and grading of the sub-soil tiling.

2. The drawing is not in duplicate so that one copy may be filed with the Department.

3. There should be a report or written statement giving full particulars of the system, including a statement of the amount of sewage to be treated at each of the tanks; the number of tanks proposed for the system, the character of soil to be used for the irrigation field, etc.

4. The tank shown on the drawings has no means of being emptied for cleaning, and no means of inspecting the main chamber of the tank without climbing over the division wall, and no means of inspecting the two connections for inlet and outlet and of removing stoppages without climbing into the tank and over the division wall. No dimension of the width of tank is shown so that it is not possible to determine the contents of either the main tank or the dosing tank. The latter should bear a given ratio to the length of the irrigation tiling, and this latter is not stated. The general suitability of the system will depend largely on the character of the soil in which the tiling is to be placed and its depth below the tiling to impervious strata. Sub-soil irrigation has not generally been satisfactory, and the defects have frequently been due to a defective adjustment of the lengths and grades in relation to the character and depth of soil. As the site of the proposed plants is some 12 miles out of Rochester and as it consumes practically a day to get out and back by train, I did not go to the site. The officials of the institution should therefore satisfy themselves as to the suitability of the soil and its proper piping.

The drawing is herewith returned.

Very truly yours,
OLIN H. LANDRETH,
Consulting Engineer.

Albany, N. Y., *September* 26, 1904.

Mr. F. H. Briggs, *Superintendent Rochester State Industrial School, Rochester, N. Y.:*

Dear Sir:—I have returned to you under a separate cover, the revised plans of a proposed sewage disposal system for the cot-

tages of the Rush colony of the New York State Industrial School of Rochester, attention being called to the enclosed copy of a report made by Professor Landreth.

Kindly furnish us with plans and specifications in accordance with the suggestions of Professor Landreth.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *July* 1, 1904.

DR. DANIEL LEWIS, *Health Commissioner:*

Dear Sir.—In reply to your note of June 3d about the proposed plans for the Rochester Industrial School, your letter was the first intimation I had that this matter had gone so far as to have plans prepared. I know nothing about them, and should prefer to reserve any opinion until I can get a little more information.

Very truly yours,
G. L. HEINS,
State Architect.

I am writing Professor Briggs to-day.

THE WESTERN UNION TELEGRAPH COMPANY.

ROCHESTER, *July* 1, 1904.

DANIEL A. LEWIS, *Health Commissioner:*

Plans for sewerage disposal sent you. Please wire disposition.

F. H. BRIGGS,
Superintendent.

ALBANY, N. Y., *July* 15, 1904.

MR. F. H. BRIGGS, *Superintendent State Industrial School, Rochester, N. Y.:*

Dear Sir:—Referring to your communication of June 8th submitting for the approval of this Department, plans and specifications of a proposed sewerage disposal plant for the State Industrial School, you are informed that the papers were referred to the State Architect, who states as follows:

"I am prepared to approve this provided it meets with your approval. It is necessary to have some sort of sewerage disposal at the new site, and we have as yet no appropriation for a general sewerage disposal plant."

The drawings and specifications have now been submitted to

our consulting engineer for examination and report. Upon receipt of his report, I will communicate further with you on the subject.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

Albany, N. Y., *September* 8, 1904.

Mr. F. H. Briggs, *Superintendent State Industrial School, Rochester, N. Y.:*

Dear Sir:—I am in receipt of your communication of the 7th inst., also of revised plan of proposed sewage disposal tank as suggested to you by Professor Landreth.

Ihave sent the plan to Professor Landreth.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

Rochester, *September* 7, 1904.

T. A. Stuart, Esq., *Clerk to Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I forward herewith, under separate cover, revised plan of the sewage disposal tank, as suggested by your engineer, Mr. Landreth. This is forwarded in accordance with his suggestion that he would revise sketch plans so that it would be necessary to make but one set of finished drawings.

Yours very respectfully,
F. H. BRIGGS,
Superintendent.

Albany, N. Y., *September* 8, 1904.

Prof. O. H. Landreth, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I have sent to you by express, a revised plan of the proposed sewage tank at the Rochester Industrial School, the Superintendent, Mr. F. H. Briggs, stating that the plan is sent in accordance with your suggestion to him.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *April* 14, 1904.

DR. DANIEL LEWIS, *Commissioner of Health:*

Dear Sir:—I enclose herewith prints of two surveys showing proposed location of water supply for the Newark State Custodial Asylum. Also a print showing the proposed location of a sewage disposal plant.

Water supply: As to this, will you kindly advise me at your earliest convenience whether you approve taking the water for the general use of the institution from the source indicated, or whether the water will have to be filtered before it goes into domestic use.

Sewage disposal: Inasmuch as the site at the rear of the institution, which at first was under consideration, could only be purchased at a prohibitive price, and furthermore, as there was no right of way for the effluent, it has been decided to abandon all negotiations looking toward that site, not only because of the cost, but because of the likelihood of damage suits from property owners abutting on the creek which would have to be used as an outlet. The site known as the Wilder property has therefore been decided upon, but in order to make use of this site advantageously the triangle was acquired from the railroad company. This triangle would enable the sewer to be run at a reasonable depth below ground to the sewage plant on the Wilder property, and the effluent from that can connect over to the present sewer which empties into a canal, I am informed. There has been no complaint that I am aware of, of a lack of sewage disposal, but it is certainly good policy for any state institution to do what it can to purify the sewage wherever it is discharged.

Under these circumstances will you kindly advise me what kind of a system should be adopted? Particularly whether a septic tank alone, similar to that to be installed at Hudson, or whether a septic tank with filter or contact beds, should be used.

There is no immediate haste about a reply regarding the sewage system, but it is very necessary to have prompt action with regard to the water supply system. Their present contract with the local company expires July 1st, and this company have, I believe, notified them that they will discontinue service after that date. At any rate, it is desired to have the plant installed before that time, and to do this we must not lose any time.

Very truly yours,

G. L. HEINS,

State Architect.

ALBANY, N. Y., *April* 20, 1904.

Mr. J. J. R. CROES, C. E., *Consulting Engineer, State Department of Health, Morris Building, 68 Broad Street, New York City:*

Dear Sir:—I enclose herewith, copy of a communication received from Mr. Geo. L. Heins, State Architect, concerning the proposed location of a water supply for the Newark Custodial Asylum, also as to the proposed location of the sewage disposal plant for the same institution.

You are requested to visit the institution that you may make an investigation as to both matters.

As in the case of the Rochester State Hospital it might be well for you to send samples of water from the Newark Custodial Asylum for chemical and bacteriological examination.

Kindly submit your report as to the proposed new water supply at your earliest convenience, Mr. Heins being particularly anxious to take prompt action on same.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *May* 9, 1904.

J. J. R. CROES, C. E., *Consulting Engineer, State Department of Health, Morris Building, 68 Broad Street, New York City:*

Dear Sir:—I enclose herewith for your information, copy of a report made by Prof. Tucker as the result of his examination of a specimen of water sent by you from the Newark Custodial Asylum and taken from "The Eben Lake Spring."

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

Analysis of Potable Water No. 769.

(Results are parts in 100,000.)

Received from J. J. R. Croes, C. E., from State Custodial Asylum, Newark. Date received, April 27, 1904; source, spring; how labeled: "From the Eben Lake Spring, Newark, N. Y."; appearance: color, none; turbidity, none; sediment, none; odor at 100 degrees F., none; chlorine in chlorides, 0.60; free ammonia, 0.0000; albuminoid ammonia, 0.0000; nitrogen as nitrites, 0.0000; nitrogen as nitrates, 0.0952; total solids, 96.20; loss on ignition, 17.80; behavior during ignition, no change; mineral matter, 78.40; total hardness (before boiling), 65.05; total hardness,

equivalent to grains carbonate lime per U. S. gallon, 37.96; permanent hardness (after boiling), 36.45; permanent hardness, equivalent to grains carbonate lime per U. S. gallon, 21.26.

This water is much harder than No. 768, but aside from this it is a remarkably pure water.

W. G. TUCKER,
Director.

May 7, 1904.

ALBANY, N. Y., *May* 16, 1904.

J. J. R. CROES, C. E., *Consulting Engineer, State Department of Health, Morris Building, 68 Broad Street, New York City:*

Dear Sir:—I enclose herewith for your information copy of a report made by Dr. R. M. Pearce upon his examination of a specimen of water taken from "Eben Lake Spring," at Newark, N. Y.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *May* 14, 1904.

DANIEL LEWIS, M. D., *Commissioner, State Department of Health, City:*

Dear Sir.—Following is the report on the specimen of water received from Mr. C. W. Winspear, superintendent of the New York State Custodial Asylum, Newark, N. Y. Specimen dated May 10th; received May 11th; analysis started May 11th.

Source: "Eben Lake Spring." Agar plates showed 80 organisms per cubic centimeter. Gelatin plates showed 300 organisms per cubic centimeter. There was no gas in any fermentation tube.

This water is passed.

Respectfully submitted,
R. M. PEARCE,
Director.

ALBANY, N. Y., *June* 2, 1904.

Hon. DANIEL LEWIS, M. D., *State Commissioner of Health, Albany, N. Y.:*

Sir:—Under your instructions I visited on April 26th, the Custodial Asylum at Newark, N. Y., and examined the existing condition of the works for water supply and sewage disposal and the projects suggested for their improvement.

The asylum occupies a tract of about 45 acres near the village of Newark, on the summit of a hill 525 feet above sea level. The main building is on the crest of the hill and the ground falls from it in all directions about 55 feet to the boundaries of the property.

The water supply is derived from the works of the Newark Water Company, which were built in 1878, taking water from springs and collecting it in a reservoir whence it is pumped into a steel water tower on the asylum grounds, the top of the tower being at the elevation + 598. These works supply the village of 5,000 population and the asylum of 500 population.

It is now proposed to enlarge the asylum accommodations so as to provide for about 100 more occupants.

It has been suggested that in this connection it would be desirable to construct works for an independent supply of water to be owned and controlled by the asylum, thus avoiding the necessity for paying the rates charged by the water company.

The source of supply suggested, is a spring on the land of Mr. Eben Lake, in the valley southeast of the asylum, 7,000 feet distant from it and at the elevation + 457.50. To procure the power necessary to lift this water to the elevation + 598, it is proposed to purchase an abandoned mill site and waterpower at Daniels' Mill, 3,200 feet from the spring and at the elevation + 498, rebuild the dam and carry water for power to a ram or turbine at the spring.

Another plan suggested is to carry the spring water in a pipe by gravity for 6,000 feet to a reservoir in the valley, 1,200 feet from the asylum boilerhouse and from there pump it by air-lift. I consider this impracticable under existing conditions.

The project for pumping by waterpower I consider to be of doubtful expediency. The expense of reconstructing the Daniel dam and laying some 10,000 feet of pipe and installing the pump would be considerable, the care and maintenance of the plant two miles away from the asylum would be a constant burden and moreover I consider the supply as of very doubtful uniformity and permanency all the year round. The Eben Lake spring is unquestionably a fine one and the water is pure and good, but very hard; but I should think the risk of its failing to yield a sufficient supply for the asylum in a very dry season too great to warrant relying upon it alone for supplying the asylum.

Sewage Disposal.

The method of disposal of the sewage of the asylum is very objectionable. It flows from the various buildings into several cesspools scattered about the grounds, from some of which it is pumped up into other cesspools and finally is carried off by a pipe into a ditch alongside of the Erie canal which discharges into a

brook. The cesspools have wooden covers, some of which are quite rotten and dangerous, and the sewage in some of the tanks is clearly in a septic condition and the exhalations are very offensive when the trap in the cover is lifted.

Plans have been prepared for a complete revision of the sewer system and the conveyance of the sewage by gravity, while fresh, to a tank on the steep hillside on the west side of the property. A good opportunity is here offered for the construction of a septic tank and supplementary contact beds for the purification of the sewage before its discharge into the State drain along the canal. The disposal works would be placed on ground sloping away from the Institution and screened from it by trees and bushes and beyond the works would be merely the track and coal sheds of the Northern Central Railroad.

The dimensions of works suitable for the purification of the sewage in this case may be given approximately as follows:

Septic tank 15 x 80 feet and 10 feet deep. The sewage to be kept at a depth of 7 feet. Contact beds of coke to be 45 x 100 feet and 4 feet deep.

The discharge pipe from the contact beds to be carried into the State drain about on the line of the present main outfall sewer.

Respectfully submitted,

J. J. R. CROES,

Consulting Engineer.

ALBANY, N. Y., *August* 5, 1904.

Prof. O. H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I have sent to you for examination and report, plans and specifications of a proposed sewage disposal plant to be constructed at the Newark Custodial Asylum.

Mr. Heins, the State Architect, verbally stated that the present plans and specifications were but supplemental to other complete plans and specifications to be furnished by him later, my understanding being that each bidder was to present plans and specifications to him upon which the bids would be based.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

SCHENECTADY, N. Y., *August* 15, 1904.

Mr. T. A. STUART, *Acting State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I beg to report as follows on the block plan showing sewage disposal at the New York State Custodial Asylum,

Newark, N. Y., submitted by the State Architect and represented by drawing No. 76, dated July 15, 1904, and specification No. 652.

Your communication of August 5th states that it is the intention of the State Architect that the present plans are only supplementary to other complete plans and specifications to be furnished by him later, after bidders have submitted their own plans and specifications.

Concerning these plans I have to submit the following points:

1. These plans are not submitted in duplicate, so that no copy is available for filing in the office of the Department as should be the case.

2. The site for the disposal plant indicated on the block plan is a very sightly and prominent one, within 200 feet of Church street, the principal avenue of approach from the village of Newark and the railroad stations to the institution, and is situated on ground having a strong slope toward the street and toward the village. It is nearer the street than any of the buildings of the institution.

The risk that odors from a plant occupying such a site might be found objectionable at the street should cause the plant to be unfavorably considered unless all other sites are barred from consideration.

3. The guarantee of a purification of 90 degrees required of the contractor would appear to be rather low for the present instance, and the method of determining the precise degree of purification is not stated; neither is the manner of securing the guarantee.

4. The specifications do not indicate the kind of security which the contractor must give as a guarantee of protection of the State from legal action on patents.

5. The specifications, page 15, indicate that the construction of the entire system is based on a contingency of funds. The discharge of septic tank effluent into the canal at the point in question would hardly seem a suitable procedure to approve.

The plans are respectfully returned to you herewith.

Yours very truly,

OLIN H. LANDRETH,

Consulting Engineer.

P. S.—If in the opinion of the State Architect the above site is unlikely to prove objectionable, the above criticism is waived so far as it may influence your approval.

ALBANY, N. Y., *December* 7, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—I am in receipt of the following communication from Mr. G. L. Heins, State Architect:

"Mr. Coons reported verbally the result of his conference with Prof. Landreth sometime since, in regard to the plans for the sewage disposal plant at the Newark Custodial Asylum and stated that Prof. Landreth thought 95 per cent. purification should be required and also suggested that the method of testing and determining the percentage of purification be stated in the specification.

Will you kindly have Prof. Landreth draft a paragraph covering this point, which may be incorporated in the specifications?"

I would be pleased to have you draft for him the paragraph he refers to as to testing and determining the percentage of purification of sewage in connection with sewage disposal plant of the Newark Custodial Asylum.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

ALBANY, N. Y., *December* 21, 1904.

Mr. G. L. HEINS, *State Architect, Albany, N. Y.:*

Dear Sir:—In compliance with a request received from you, I enclose herewith, draft of a paragraph prepared by Prof. Olin H. Landreth to be inserted in the specifications of the sewage disposal system to be constructed at the Newark Custodial Asylum.

Very respectfully,
DANIEL LEWIS,
Commissioner of Health.

SCHENECTADY, N. Y., *December* 10, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—Agreeable to your communication of the 7th inst., requesting me to draft for the State Architect a paragraph to be inserted in the specifications for the sewage disposal system for the State Custodial Asylum at Newark, N. Y., to cover the matter of the degree of purification to be secured by such system, I beg to submit the following paragraph for the purpose stated. I have not the form of the general specifications here and therefore cannot arrange it to fit into that form.

I am, dear sir,

Very truly yours,
OLIN H. LANDRETH,
Consulting Engineer.

The sewage disposal system shall, before acceptance, be tested by the Board of Managers or its representatives while under regular service conditions, and will not be accepted unless such shall

show by comparative, simultaneous analysis of the original crude sewage and the final effluent from the system, a reduction of organic matter of ninety (90) per cent., and a reduction of bacteria of ninety-five (95) per cent. Each of the four analyses—two chemical and two bacteriological—shall be made on a composite sample made up of at least ten (10) component small samples each gauged in amount to be proportional to the rate of flow of sewage and effluent at the time and taken at half-hour intervals on such day and at such time of day as the Board of Managers or its representatives shall determine.

The "organic matter" shall be determined by the average of the albuminoid ammonia and the oxygen consumed; and the number of bacteria shall be determined by counts of colonies on culture plates.

Component samples shall be preserved until the analyses are made at temperatures between 40° and 50° Fahr., and shall be thoroughly mixed before taking the composite sample for analysis.

INVESTIGATIONS BY ORDER OF THE GOVERNOR.

LAKE CHAMPLAIN INVESTIGATION.

STATE DEPARTMENT OF HEALTH,
ALBANY, N. Y., *June* 30, 1904.

Hon. B. B. ODELL, *Governor State of New York, Albany:*

My Dear Sir—I have the honor of transmitting to you a complete report upon the conditions at Lake Champlain and its tributaries, which you ordered me to investigate.

The complaints were concerning the pollution of these waters by the pulp mills situated on the Bouquet and Au Sable rivers.

The report has been prepared by Prof. O. H. Landreth, consulting engineer of the Department. The supplementary reports are by Dr. Willis G. Tucker, chemist of the Department, and Dr. G. C. Whipple, the sanitary biologist, reports upon the vegetable growths in the lake which had been attributed to the refuse from the pulp and paper mills. Exhibits are also attached showing the former agreement with the New York and Pennsylvania Company with the State Fish and Game Commission, and the lack of compliance, in many respects, with the stipulations made by the company.

On pages 30, 31 and 32 of the report will be found the conclusions arrived at by Professor Landreth, and on pages 32 and 33 are the recommendations made to us, with the view to abating the nuisances complained of.

These recommendations, I beg leave to suggest to you, appear to be upon the lines on which an executive order should be issued.

I may add that a very exhaustive examination of the entire subject has been made, and notwithstanding the length of the report, I think you will find it both interesting and convincing.

Should you desire any further information, I shall be pleased to furnish it.

Yours very respectfully,
DANIEL LEWIS,
State Commissioner of Health.

INVESTIGATION

OF THE

POLLUTION

OF

LAKE CHAMPLAIN, THE BOUQUET RIVER AND THE AUSABLE RIVER.

By Olin H. Landreth,
Consulting Engineer, New York State Department of Health.

With Supplementary Reports

BY

Dr. Willis G. Tucker,
Chemist, State Department of Health,

AND

Dr. G. C. Whipple,
Sanitary Biologist.

May, 1904.

CONTENTS OF THIS REPORT.

ENGINEERING SCHOOL OF UNION COLLEGE,
SCHENECTADY, N. Y., *May* 30, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.*

Dear Sir—I beg to submit the following report on my investigation of the matter of the pollution of the Bouquet river, the Au Sable river and Lake Champlain, by mills situated at Willsboro and at Au Sable Forks on the two rivers above named, made in accordance with your instructions.

Several personal examinations of the localities concerned have been made, a large number of specimens and samples have been taken and examined, and many persons having knowledge of the conditions have been interviewed. As the two rivers mentioned are apparently the chief source of the pollution complained of, they will first be considered.

BOUQUET RIVER.

This stream has two branches: the main river and the North Branch. The main stream rises in the town of Keene, Essex county, flows northeast for about 35 miles and enters Lake Champlain two miles southeast of the village of Willsboro. The North Branch of the Bouquet river rises in the town of Chesterfield, Essex county, flows southeasterly and then easterly for about 15 miles and joins the main stream 2½ miles above and southwest of the village of Willsboro. The drainage area of the river at its mouth is 275 square miles; the topography is rough, and inclined toward mountainous; the surface is largely in forest and brush; geologically the district belongs to the Pre-Cambrian, and the rocks are mostly igneous, norite or gabbro predominating. The area under cultivation being relatively small, and the soil and rock formation igneous, the waters of the river and tributary streams are soft and clear except at freshet, though somewhat colored by the forest and swamp vegetation in the head waters.

The sources of pollution of the river comprise the tributary population, the few remaining sawmills on the stream, and the pulp mills at Willsboro. The total population of the drainage area is between 4,500 and 5,000. About one half of this population reside in the village of Elizabethtown and the unincorporated villages of Willsboro, Whallonsburg, Wadhams Mills, and a few

other hamlets, all on the river or tributary streams. Elizabethtown, the largest of the group, has a population of about 500, and has a few drains and private sewers leading to the river. Its distance from the mouth of the river is about 25 miles as the stream flows. Similar pollution of lesser amount occurs at Whallonsburg and at Willsboro. No evidence whatever of the pollution from these sources or from the new sawmills was visible at any point above Willsboro village, except just below Elizabethtown, where a small amount of sawmill waste was discovered. The aggregate pollution from these sources does not, in my opinion, play any important part in the objectionable conditions complained of in the lake, though the pollution from the privies and drains at some of the villages would undoubtedly tend to impair the water of the river as a source of drinking water supply, if that question were involved.

At the village of Willsboro is situated the Willsboro plant of the New York and Pennsylvania Company's Chemical Fibre works, which produces a fine grade of wood pulp, called "chemical fibre," from natural wood by means of the "soda-ash" process, which dissolves the gums and resins of the wood, releasing the insoluble wood fibre or "pulp" by means of a hot solution of caustic soda in which the wood is treated, and from which the valuable soda is recovered for continued use by evaporation and burning; the water being driven off by evaporation, and the organic matter dissolved from the wood being consumed by burning, leaving the soda to be recovered by solution from the "black-ash" or charcoal resulting from this burning. The New York and Pennsylvania Company is a foreign corporation, incorporated under the laws of Pennsylvania during about 1890. The principal place of business is New York, and the officers of the company are:

Mr. A. G. Paine, president, New York.

Mr. M. M. Armstrong, vice president, Philadelphia, Pa.

Mr. M. B. Sloat, secretary and treasurer, Mount Vernon, N. Y.

Mr. R. L. P. Mason, superintendent, Willsboro, N. Y.

Mr. A. G. Paine, Jr., general manager, New York.

The wood used by the company for making the fibre is mainly poplar, bass, beech and white birch, of which about 1,000 cords per month are used. The soda-ash used is known on the market as "light 58 per cent. soda-ash," and before being used is causti-

cised by lime. This feature bears directly on the matter of the refuse from the mills, and hence will be described: Fresh unslacked lime is thrown into tanks containing a solution of soda-ash, partly furnished by the solution of the recovered soda-ash from the black-ash containing the soda-ash previously used, and partly new soda-ash added to make good whatever loss there may have been in recovery; the lime thus slacked dissolves and reacts with the soda-ash, forming carbonate of lime—which being insoluble, precipitates—and caustic soda which remains in solution. This reaction is represented by the following chemical equation:

$$Na_2CO_3 + CaO\ (H_2O) = 2NaOH + CaCO_3$$

where:

Na_2CO_3	represents	sodium carbonate (soda-ash);
CaO	"	unslacked lime;
$CaO(H_2O)$	"	slacked lime;
$2NaOH$	"	sodium hydrate (caustic soda);
$CaCO_3$	"	carbonate of lime.

Quantitatively, the above reaction yields the following weights of the two resulting products:

—100 lbs. of soda-ash;
— 56 " unslacked lime, pure;
— 18 " water;

produce,

— 80 lbs. of caustic soda, and
—100 lbs. of carbonate of lime.

From this it can be seen that for every 56 lbs. of pure unslacked lime used, 100 lbs. carbonate of lime is formed; or for every 100 lbs. of pure unslacked lime used, 178.6 lbs. carbonate of lime is formed.

As the lime used at Willsboro is said to be 98 per cent pure, every 100 pounds of this commercial unslacked lime should produce 175 pounds of carbonate of lime. This carbonate of lime, called at the mills "lime sludge," is a refuse product at Willsboro, and is run off into the sludge reservoir or basin, hereafter described. The superintendent reports that about 15,000 pounds of unslacked lime are used per day, so that about 26,250 pounds of lime sludge are produced and discharged into the sludge basin per day. If the ingredients are mixed in the above proportions, the lime will all be converted and no soda-ash will remain.

If, however, a surplus of lime is used, then the sludge will carry out some lime, and correspondingly, if a surplus of soda-ash is used, the sludge will carry some uncausticised soda-ash. As each defect represents a commercial loss, it is unlikely that very large amounts of either free lime or soda-ash are allowed to escape, though, as the soda-ash is much the more expensive, some slight excess of lime is probably used to prevent loss of uncausticised soda-ash. Similar determinations of the amount of lime sludge discharged, by volumetric data, show the amount to be even greater than the above determination.

The next item of refuse discharged from these mills is the "bleach-sludge," or refuse from the tanks where the chlorinated lime is dissolved in the preparation of the "bleach-liquor" used in whitening the wood fibre. About 5,000 pounds of chlorinated lime are used per day, and the sludge from the mixing tanks, composed of slacked lime, carbonate of lime and other insoluble materials, amounts to about 3,000 pounds, dry weight, per day. This material is also discharged into the same sludge basin as the lime sludge. The data secured on the *volume* of this bleach sludge indicate even larger amounts than the above determination by weight.

The black-ash from the soda-recovery plant furnishes, after the contained soda-ash has been dissolved out, the next class of refuse from these mills. The total dissolved matters from the wood are carefully removed, in conjunction with the soda used as a solvent, by washing the pulp or fibre in tanks with clean water by a systematic method of "concentration" till all remaining traces of soda and all the soluble portions of the wood are removed from the fibre. The water used for this purpose is not wasted, but evaporated by "triple-effect" Yaryan evaporators down to a density of 36 to 39 degrees Baumé, in which condition it resembles coal tar in consistency and color.

This concentrated material or "stick," as it is called, carries per day about 65,000 pounds of dissolved woody matter, and about 40,000 pounds of soda-ash, both free and in combination with the soluble materials from the wood. This stick is then run into a rotary furnace, where the remaining water is driven off, the soda compounds broken up, and the volatile organic matters driven off and burned, leaving practically all of the original soda and the greater part of the fixed carbon in the form of charcoal.

From this charcoal or black-ash the soda-ash is then dissolved, and the remaining black-ash waste is discharged into the sludge basin used for the other classes of refuse material. It is difficult to ascertain the amount of this black-ash refuse sent to the sludge basin per day, but an approximate method of estimation indicates that it is not less than 15,000 pounds, and may be much more than this. In form this waste is a light-weight charcoal, occurring in coarse form when it first leaves the furnace, but easily broken up into smaller form, and occurring mainly in this form as seen along the shores of the lake. The last of the insoluble waste materials discharged from the mills is the wood waste, produced in preparing the wood for the digesters. This material has in the past been mainly discharged directly into the river, but during the past year it has been otherwise disposed of. It has been said that the boiler cinders also have been discharged into the river, but my examination indicates that, while there is a large amount of this material in the river below the mills and to lesser extent along the lake shore, it is possible to account for this by the explanation given by the superintendent, that it came from the washing away of an extensive piece of cinder bank or filling below the mill.

Beside the above insoluble waste materials from these mills, there is some soda-ash waste which enters the river. The total amount of fresh soda-ash used per day to replenish losses is between 2,500 and 3,000 pounds. These losses occur principally in the rotary furnace and in the incomplete leeching of the black-ash. The amount of the latter, which measures the amount going out into the stream, is probably not under 1,000 pounds per day.

SLUDGE BASIN.

The lime sludge from the causticising tanks, the bleach sludge from the chloride of lime tanks and the black-ash waste from the leeching tank, are, in the normal condition of operation at the mills, discharged into the sludge basin or reservoir, which is situated on the opposite side of the river from the mills and further down the river. The waste materials are run across the river through an iron trough suspended from a suspension cable. Owing to a faulty design of this suspension cable and its hangers supporting the trough, the trough sags at the center when mate-

rials are running through it, and waste over the side directly into the river. A larger trough has recently been installed with the apparent intention of remedying the defect, but the defect is more a matter of gradient than size, and the trouble continues, though to somewhat less extent than before the change of size.

This trough empties directly into the artificial reservoir or basin, which was formed in an old abandoned channel of the river or "cut-off" across a bend through which old channel the river flowed—prior to the construction of the basin—at high-water periods. The basin was formed by building a wooden crib-dam across the channel at both upper and lower ends of the old channel, where it leaves and rejoins the main river channel, thus enclosing an area of some eight or ten acres, which, if properly kept from overflow and leakage from the river, would give a place for depositing the refuse materials until filled up. The dam at the upper end however is not water-tight and crest is about level with ordinary high water, and beside this, the high water of the past two or three springs has cut around the end of the crib work so that at each recurrence of high water, the basin has been flooded, and on some occasions the current has run through the basin with sufficient force to wash out and carry away a considerable portion of the materials then deposited there. The amount of sludge and waste which had accumulated in the basin at the date of my last inspection was but a fraction of that which the mills must have produced since the accumulation began, i. e., since the basin was constructed three years ago. Assuming the density of the lime and bleach sludges to be each 90 pounds per cubic foot, exclusive of the contained water, and of the black-ash waste to be 50 pounds per cubic foot, the above determinations of the quantities of refuse discharged from the mills would give the following:

AMOUNT OF REFUSE DISCHARGED FROM WILLSBORO MILLS.

KIND OF REFUSE.	Weight per day.	Weight per annum.	Volume per annum.
	Pounds.	*Pounds.*	*Cubic feet.*
Lime sludge	26,000	9,100,000	101,100
Bleach sludge	3,000	1,050,000	11,600
Black-ash waste	15,000	5,250,000	105,000
Total	44,000	15,400,000	217,700

This aggregation, which does not include the wood waste and siftings from the chipped wood, nor cinders, both of which are variable and uncertain, nor the lost soda-ash, which goes into solution in the stream, is sufficient to fill an acre of land five feet deep in a year of 350 running days. The crib-work forming the dam at the upper end of the basin is not straight, but is formed of three straight sections, 170 feet, 155 feet and 100 feet long respectively. The crib-work is about 5 feet high, 3 feet across at the top, 5 at the bottom, is composed of 10-inch timbers planked with 2-inch planking on the outer or river side and filled with stone. There is no planking on the top or inside, and there is no embankment or other means of keeping the water out. The crib-work at the lower end of the basin is like that at the upper end, except that it is wider and generally lower. It has an overflow with apron and also a pipe and valve for letting out the water, though this is superfluous, as the water passes through the crib-work readily. At each of my inspections there was a stream of water passing through the basin and leaving it very strongly charged with alkaline matter, apparently soda, and with a chlorine odor.

The discharge of refuse from these mills and this sludge basin have been the cause of State inquiries on previous occasions. A complaint was made of the discharge of refuse from these mills by the State Forest, Fish and Game Commission some six or eight years ago. As a result of this complaint the New York and Pennsylvania Company installed a detention basin for the sludge and other refuse. This did not prove satisfactory, and in 1900 an action was brought against the company by the Forest, Fish and Game Commission by Mr. David Gray, its attorney, to secure abatement of the pollution from the mills, on the ground of its injurious effect on fish in the lake. Before this action came to trial the New York and Pennsylvania Company proposed to the Commission to do certain things, including the building and maintaining of a system of dams to enclose and form a basin for the reception of the mill wastes. At the upper or west end of the basin the dam was to be built in two sections; the southerly one to be built of stone laid in cement mortar and 140 feet, more or less, in length; the northerly section was to be a crib dam with stone filling, and with 4-inch plank facing. The easterly or down-

stream end of the basin was to be of crib-work formed of 10-inch timber stringers with 8-inch binders, filled with stone, anchored and banked with sand, and planked with two thicknesses of 2-inch plank. There was also to be an earthen embankment at a low point between the upper and lower dams. The proposal was accepted by the Forest, Fish and Game Commission and was signed by its president, Hon. W. A. Wadsworth, on February 12, 1901. The correspondence and the formal stipulations and agreement are in the office of the Forest, Fish and Game Commission, and I attach a copy of the papers pertinent to this inquiry.

From this action and settlement, it was the evident intention to secure such a water-tight and permanent enclosure or basin as should keep river and lake waters out, and the mill wastes in the basin; and the necessity for a substantial structure was indicated by the requirement that the main dam at the west or upper end should be of masonry laid in cement mortar. I have been unable to learn that any action was ever taken authorizing the company to make the deviations indicated in the comparison between the plan as stipulated and that actually built, and am obliged to assume that no such authority was given. On October 2, 1901, the Chief Game Protector of the Forest, Fish and Game Commission appears to have directed Mr. J. F. Shedden, fish and game protector, of Mooers, Clinton county, to make an inspection of the work constructed at the site of the proposed basin, and on October 7th a report on such inspection was made by Mr. Shedden to Chief Protector J. W. Pond at Albany. A copy of this report is appended hereto. Since the date of this inspection the westerly dam of crib-work has been extended northerly to cover a new channel where the river cut into the basin, but no change in the character of the construction has been made from the original crib-work reported by Mr. Shedden. Also at the easterly or lower end the crib-work has been extended, but its character has not been changed.

BOUQUET RIVER BELOW WILLSBORO MILLS.

Two inspections were made by me of this portion of the river. On both occasions the bed of the river showed numerous deposits of cinders and chalky deposits at two or three places where the river current was slow and the water quiet. On one occasion, in

November, 1903, the river and lake were very low and the river bar and the sand spits flanking the mouth of the river were uncovered. The shore of the lake at the mouth of the river in places and the surface of these sand spits was covered with wood refuse composed of chips, screenings or siftings, bark and black-ash waste. This material was in some places two or three feet in depth and in the aggregate near the mouth covered at least two acres. Some of this wood refuse was old and water-worn, but the greater part was comparatively fresh, and some of it was very recent. It was nearly all sufficiently waterlogged not to float. On the occasion of my previous visit the lake level was higher and the bar and spits covered by water and none of this refuse was visible.

LAKE SHORE: VICINITY OF WILLSBORO AND WILLSBORO POINT.

The conditions which gave rise to the first complaints received at the Department were found on visiting the lake to consist in the fouling of the shore by large amounts of dead and decaying aquatic vegetation that had been cast ashore by the waves. The date of my first examination of the lake shore was June 3, 1903, and the growth had flourished then for over a month. The lake level on June 3d was over three feet lower than the level during April and early May, and the receding of the water had left the growth above water and had doubtless been the cause of its being destroyed. The decomposing vegetation, mingled with an impalpable mineral material, caused the mass to be very unsightly and objectionable, covering as it did the entire lake shore at nearly every point examined from the mouth of the Bouquet to the mouth of the Au Sable. Where the lake level had receded so as to leave the coating on the stones above the reach of the waves, the material dried out and the fine mineral matter gave the coating a nearly white appearance. This coating was so prominent as to give a white, banded appearance to the rocks and stones on the shore and could be seen from a long distance. The coating closely resembled pulp waste and this gave the impression to the people along the lake shore that it was pulp from the mills, but a microscopical examination showed not more than a dozen fibers

of pulp in about fifty samples taken from a dozen different points extending from a point one mile south of the mouth of the Bouquet river to the mouth of the Au Sable river.

My examination of the refuse or coatings on the stones which had become dry and bleached showed them to consist of a gelatinous mass in which was embedded dried remains of various forms of lower vegetable life found in fresh waters containing organic or mineral impurities. Of these forms of life in the dried coatings on the stones by far the greater number were members of the *diatomacea,* with fewer and less perfect remains of the *chlorophyceae* or green algae. It is quite possible that the greater abundance of the diatoms was due to their greater resistance to being broken up and washed away, owing to their siliceous cells or "valves," although examinations of the fresher but dead material along the shore still showed a preponderance of diatoms, though less striking. These statements refer to samples taken in the springtime. Samples taken in the summer and late fall did not show the diatoms in such abundance, but on the contrary showed a preponderance of filamentous green algae. The dried material forming the coatings and deposits taken in the spring also contained much fine mineral matter much finer than even fine sand, in fact, impalpable, white or nearly so, and closely resembling the carbonate of lime sludge taken from the sludge basin at the Willsboro mills. This mineral material in the coatings on the stones was found present in all samples taken in the spring, but in different amounts. It was most abundant at points from two to five miles north of the mouth of Bouquet river, and least so in the samples taken from the head of Willsboro bay. The white, banded markings on the rocks and shore were seen at many points on both east and west shores of the lake, though more abundant on the west shore. Wherever examined the same dried coatings above high water and the same floating or lodged mass of offensive decaying matter were found as has been described above, though in differing amounts. The presence of this decaying gelatinous matter floating along the shore, filling the interstices between stones, and dashing up on the rocks, docks and boats produces conditions which are extremely obnoxious, and not only defiles the natural beauty of this unrivaled lake, but gives rise to objectionable odors when the weather is warm.

Whenever these deposits or mass of decaying vegetation are present in the waters along the shore and on the rocks and stones, the water along the shore in these regions is utterly unfit for any use whatever, not only on account of the decaying organic matter, but also to the precipitate of impalpable mineral matter.

I examined a sample of sediment taken from a water tank at the residence of Mr. A. H. Ellis, who lives on Willsboro Point, about three or four miles north of the mouth of the Boquet river, which tank is supplied with water pumped from the lake by a windmill. A simple chemical test showed the material, which was nearly white in color, to be mainly composed of calcareous material, with some siliceous matter. The private correspondence between one of the complainants and a prominent physician in Baltimore concerning cases of illness thought to be due to the use of certain waters, which correspondence was handed you, had reference to the water from this tank.

In the vicinity of the mouth of the Au Sable river, several places were found in August last where there were heavy deposits of coarse wood pulp firmly cemented together into a mat nearly one fourth of an inch thick by some gelatinous material. The samples examined under the microscope did not show any indications of vegetable organisms. The material was very tenacious and could be torn off the beach in large strips several square feet in area. It resembled the coarsest kind of rough, heavy brown paper.

AU SABLE RIVER.

Like the Bouquet river, the Au Sable has two principal tributaries, the East Branch and the West Branch. The East Branch rises on the southern slope of Mt. Marcy in the town of North Hudson, Essex county, and flows north-northeasterly some 38 miles to Au Sable Forks, where it joins the West Branch, which rises on the northwestern slope of Mt. Marcy in the town of Keene, Essex county, and flows about 34 miles northeasterly to its junction with the East Branch. From Au Sable Forks the river flows northerly through Au Sable Chasm to the lake, which it meets about 4 miles north of Port Kent and about 10 miles south of Plattsburg.

The drainage area of the river at its mouth is about 490 square miles. The topography is quite similar to that of the Bouquet, though possibly somewhat more mountainous and with a somewhat larger proportion in forest. Like the Bouquet district, the surface geology of the Au Sable belongs to the Pre-Cambrian period, though the latter contains rather more of the Adirondack gneisses and the soil is correspondingly more sandy. There are a large number of lakes and ponds within this drainage area, including the Lake Placid and the Au Sable lakes. These have the effect to make the color of the water a darker brown and to cause the spring floods to be less severe. The pollution of this stream is that which comes from the population on its drainage area, a number of sawmills and the sulphite pulp mills of the J. & J. Rogers Co. at Au Sable Forks. The permanent population of the drainage area is about 11,000 people, the great majority of whom live quite directly on the principal and tributary streams. The principal villages and hamlets within the drainage area are: Lake Placid or Newman, Keeseville, Au Sable Forks, Wilmington and Jay. The summer population is doubtless two or three times the permanent population, as this region is one of the most popular of the Adirondack districts. Lake Placid, the largest village, has a sewer system, but it has recently been required by the State Department of Health to install a sewage disposal works for the treatment of the sewage, not only of the village, but of all the hotels in the vicinity. Keeseville has several sewers entering the river, as has also Au Sable Forks, besides a number of private sewers entering the streams in the smaller hamlets. While these sewers would have an important bearing on the matter of a potable supply if taken from the river at a point below the point of sewage discharge, they are not of any special importance in relation to the question of the pollution of the lake and the lower Au Sable river, as complained of in the complaints submitted to the State Department of Health.

PULP AND PAPER MILLS AT AU SABLE FORKS.

The chief source of pollution of the Au Sable river is the pulp and paper plant of the J. & J. Rogers Co. at Au Sable Forks, situated in the town of Wilmington, Essex county, N. Y. The company manufactures spruce pulp and manilla papers, using

for this purpose upward of 100 cords of wood per day. The process used in the making of the pulp is the "sulphite of lime Process," in which the encrusting lignin of the wood is dissolved by cooking or "digesting" the chipped wood in a weak solution of bisulphite of lime. liberating the fiber, which is largely cellulose.

The J. & J. Rogers Co. is a domestic corporation, originally incorporated in 1871 as the Rogers Iron Company, but reincorporated in 1893 under the present form of corporate title. The officers of the company are: James Rogers, president, Au Sable Forks; J. M. Sheffield, secretary, Au Sable Forks; Henry Rogers, manager of pulp mill, Au Sable Forks.

The company employs at the sulphite mill about 150 men and about 50 at the paper mill adjoining. The procedure is the usual sulphite-mill practice; the wood is prepared for the digesters by chipping and screening; there are five digesters; four of them are 10 feet diameter by 30 feet in height and one is 14 feet diameter and 38 feet in height. The sulphite liquor used for cooking the wood is formed by passing the fumes of burning sulphur through lime water, the sulphurous acid formed uniting with the lime to form bisulphite of lime with small amounts of sulphate of lime and some uncombined free sulphurous acid. After digesting for several hours until the fiber has been sufficiently separated or loosened from its encrusting lignin, the contents of the digester are blown out into tanks where the waste liquor, containing the dissolved portions of the wood, in combination with the sulphite of lime, and the remaining free sulphurous acid that has not been recovered, is washed out and discharged into the river or elsewhere, leaving the fibrous pulp alone in the tanks. In this process of washing the pulp a considerable amount of the finer sizes of pulp generally escape by passing through the screens. The usual yield of pulp per cord of wood by the sulphite process where the wood is spruce varies from 1,000 to 1,300 pounds. This is on the basis of "air-dried" pulp. The weight of a cord of spruce wood seasoned to correspond to air-dried pulp is not less than 2,800 pounds, and probably higher on the average. If we assume this mill recovers the highest percentage of pulp quoted above, viz, 1,300 pounds per cord, the refuse from the wood carried out in the

waste liquor would be 1,500 pounds per cord of wood treated, or 150,000 pounds per day. The liquor also contains nearly all the sulphite of lime which was put into the digester, though of course largely in combination now with the wood products as well as the remaining free sulphurous acid. These compounds of sulphite of lime and wood lignin are insoluble in dilute solution such as occurs as soon as the waste liquor is diluted by the river water, and accordingly precipitate out of the river water as soon as the water reaches a quiet condition, as in the lower ponds or in the lake. As the ponds are well scoured out at times of freshet, the accumulations of precipitated wood matters from solution are probably mostly carried out into the lake when such freshets occur. The free sulphurous acid contained in the waste sulphite liquors acts as an antiseptic and prevents the decomposition of the woody compounds while the sulphurous acid remains, but as soon as this is diluted in the river this antiseptic action ceases and the woody compounds decompose, but, from their nature, very slowly. Robbed of its moisture this woody precipitate comprises from 80 per cent. to 85 per cent. of organic matter, and from 15 per cent. to 20 per cent. of mineral matter, the latter containing not only the remaining lime and sulphur, but also the natural wood-ash from the lignin.

No chemical analyses of the waste liquor from this mill were made, but from an analysis quoted by Griffin from a mill where sulphur recovery was followed and therefore where the waste liquor doubtless carried about the same relative proportions of the several solid ingredients, though not necessarily the same dilution with water, the sulphur in the waste liquor was found to comprise 4.5 per cent. and the lime 9.5 per cent. of the total solid ingredients of the waste liquor. The sulphur and lime, therefore, comprised 5 per cent. and 12 per cent., respectively, of the remaining solid refuse in the waste liquor. If, in order to insure that our estimate shall be conservative and just to the Rogers Co., we assume that at this mill the sulphur and lime comprise only 4 per cent. and 10 per cent., respectively, of the *other* solid ingredients in the waste liquor, we shall have the weights of sulphur and lime carried out in the waste liquor as follows: —150,000 pounds woody waste × 4%=6,000 pounds sulphur per day; —150,000 pounds woody waste × 10%=15,000 pounds lime per

day, making the aggregate dry weight of refuse in waste liquor as follows:

KIND OF REFUSE.	Per day.	Per year of 350 days
Woody waste (dry weight)	150,000 lbs.	52,500,000 lbs.
Sulphur "	6,000 lbs.	2,100,000 lbs.
Lime "	15,000 lbs.	5,250,000 lbs.
Total in liquor (dry weight) ..	171,000 lbs.	59,850,000 lbs.

These are very conservative, minimum estimates; the actual amount of the several kinds of refuse is very likely in excess of the above figures. It is to be understood, of course, that the sulphur and the lime are not assumed to be in a free state, but both are doubtless combined with the woody matter, forming more or less complex and somewhat unstable compounds. These compounds on entering the river water are slowly decomposed and other more stable compounds formed in their place. The color of the waste liquor as it comes from the digesters and from the washing tanks is a bright, clear liquor of a brown or clear coffee color; later it changes in color to a blackish and more turbid appearance, largely due to changes in the sulphur compounds. The odors undergo corresponding changes; the acrid, sulphurous odor which is so pronounced near the mill gradually disappears, and in its place a sweetish, slightly pungent odor, characteristic of sulphite refuse, gradually develops as one goes farther down stream. This odor, while not offensive to some persons, is extremely nauseating to others; its character and strength appear to vary considerably with the stage of the river and doubtless with the temperature and degree of dilution in the stream. In the lower reaches of the river, below the Au Sable Chasm, where the water is very slack and precipitation very evident, the odor was almost offensive and at times it is said to be very offensive.

I enclose the affidavit of Mr. James Baggs, of the town of Peru, Clinton county, concerning sickness in his family said to be due to the river water. Mr. Baggs lives immediately on the river bank a short distance below the lower end of Au Sable Chasm, and the conditions at his place were very offensive at the time of my inspection of that portion of the river, in August, 1903.

At Keeseville, just above the Au Sable Chasm, the pollution of the river due to pulp mill waste is very serious. The village has a population of about 2,200 people; is situated directly along the river banks, and takes its domestic water supply directly from the river and without filtration. The village has no public sewer system, but there are a number of isolated sewers of a partially public character and a few additional private sewers. Keeseville is injuriously affected by the pollution of the Au Sable river in three ways:

(1) By injury to its public water system.

(2) By the fouling and defacement of the banks of the river and the surface of the water by sludge and foam.

(3) By the production of disagreeable odors.

The injury to the public water supply affects both sanitary and property rights, while the defacement of the banks, bed and surface of the river affects mainly property interests. These different relations will be considered in their order.

The water system was built by the village corporation in 1883 and extended later. The total cost to date has been nearly $40,000, of which the village still owes on water bonds some $12,000 or $13,000.

Originally the water rents paid all expenses and interest charges, but owing to the bad character of the water the revenues have of late fallen off and the number of consumers has diminished. For the first ten years or so of the life of the system the water was clear, pure and satisfactory. After the sulphite mill at Au Sable Forks had been running about a year the trouble with the quality of the water began. On September 15, 1899, Dr. Willis G. Tucker, chemist of this Department, analyzed two samples of the Au Sable river water, one taken at Wilmington above Au Sable Forks, the other taken at the intake of the Keeseville water supply. These analyses showed the following solid matter determinations:

Au Sable River water—Parts per 100,000—*September* 15, 1899.

Source.	Total solids.	Mineral matter.
River at Wilmington, West Branch........	5.40	1.80
River at Keeseville, water intake..........	23.20	7.00

My examination showed the water to be very highly colored and I was informed that very great trouble had for some time been experienced by frequent stoppages of service pipes from accumulations of foreign matter in these pipes. I have examined a section of pipe so filled up and also some sludge taken from the suction chamber of one of the pumps at the pumping station. The samples from the pump chamber contained a large amount of slimy wood sludge and pulp, with a variety of forms of vegetable life, in which the fungus Crenothrix or the so-called "iron-bacteria" was abundant. This organism thrives where iron oxide is abundant either in the water itself or in the surroundings; in this case the iron was supplied doubtless by the metal of the pump chamber and the decomposing woody precipitate furnished the remaining conditions necessary to its development. The odor from the mass was rank, as much of it was dead and occupying all stages of putrefaction. The material in the section of iron pipe was of similar character though with more iron oxide present. The section of pipe had been entirely closed up in spite of the working pressure of 75 pounds per square inch which had been used to try to keep it open. Mr. M. A. Thomas, formerly superintendent of the water department of Keeseville, writing on the 8th of December, 1903, says:

"Our whole water system is practically ruined except for fire purposes and for washing, and there is great complaint of the water turning the clothes that are washed yellow, and some families will not even wash with it, and no one can drink it."

Propositions have been made both by the Rogers Co. to the village and by the village to the Rogers Co. looking to the latter company meeting the cost of a new system of water for the village, but the two parties have been unable to agree as to terms. Perhaps it is just as well that such is the case, for the adjustment of this single conflict of interests would leave many others unsettled, and some of these or all together must some time inevitably prevail and secure the suppression of the unquestioned pollution of the river and the infringement of public and private rights. The J. & J. Rogers Co. fully appreciate this fact and have made repeated efforts to discover a method by which the sulphite refuse liquor could be taken care of by other means than the crude discharge into the river, and still at a cost which would not be pro-

hibitory. The sincerity of the company in its efforts to discover such a method cannot be questioned, though in promptness and activity in this search it has left very much to be desired.

It is proper to state that the treatment of refuse sulphite liquor presents one of the most difficult problems in applied industrial chemistry of waste products. Carrying, as this waste material does, more than one half the total weight of the raw material, it is evident that it would not be allowed to run to waste if any feasible means were known by which it could be utilized. This, however, does not excuse those who, by its discharge, pollute streams and bodies of water and thereby impair or destroy the interests of others. If the profitable utilization of this material is not possible, then its disposal, even at heavy expense, by means that shall not infringe either public or private rights, is the evident duty of whoever would use the sulphite process, and the same general principle is clearly true for all manufacturing refuse.

Following the official examination of the pollution of the Keeseville water supply by Mr. C. W. Adams, consulting engineer for this Department, in September, 1899, the J. & J. Rogers Co. commenced experiments to devise a method by which the sulphite liquor could be treated so as not to pollute the river. The first plan attempted was, I think, to treat the waste liquor with marl brought from a distance; this failing, the liquor was then pumped up on to extensive sand plains near the mills, but many feet above them and the river. For a time this appeared to serve the purpose, but soon the sand became saturated and as little or no effective reduction of the organic matter can occur in the soil, the liquor presently began to leach out of the side of the hill and enter the stream in a blacker and more offensive state than when fresh from the digesters or washing tanks. The company then experimented with a plan by which it was proposed to evaporate the water in the liquor by spraying it into the air to a considerable height and in the form of fine spray. The company then engaged a chemist to study the question of the chemical recovery of some of the contained materials. I am not informed, but I infer nothing came of this, as I have just been advised by Mr. James Rogers, the president of the company, that an experimental plant capable of treating about 10 per cent. of the total output

of refuse liquor has been contracted for, and will be erected and in operation within a month. This plan contemplates the evaporation of the contained water in the waste liquor by artificial heat, and the use of the concentrated or dried product for the extraction of some of the contained wood products. If this plant succeeds, it is proposed to erect a plant capable of treating the entire output of waste liquor. Such a plant it is stated will cost about $30,000. I did not learn enough of the details of what is proposed to form an opinion as to the probable success of the undertaking as a commercially economical means of abating the pollution. At most this is a question of greater importance to the company than to the Department or the public. It is certainly possible to stop the discharge of waste liquor into the river, for if no better plan is available the liquor can be evaporated and burned.

This investigation naturally comprises an inquiry into:

(1) The existing pollution and the attendant facts, circumstances and conditions.

(2) The causes and the responsibility for the pollution and for the objectionable conditions.

(3) The remedies and their application.

The report thus far has been occupied with the first of these topics. The others follow:

CAUSES OF THE EXISTING POLLUTION.

RELATION BETWEEN THE DISCHARGE OF REFUSE FROM THE PULP MILLS AT WILLSBORO AND AU SABLE FORKS, AND THE POLLUTION OF THE LAKE.

From the foregoing description of the existing facts and conditions it is quite evident that the pollution of the streams and the lake may be divided into two naturally distinct classes: (1) That in which the polluting material itself comes directly from the mills, such as the carbonate of lime, wood refuse and black-ash waste from the Willsboro mills, and the wood sludge, sulphur compounds and waste pulp from the Au Sable Forks mills; (2) That due to the growth and decay of the aquatic vegetation, which constitutes a part of the objectionable conditions. The first of these groups needs no discussion. Certain refuse materials are

discharged into the streams at the mills and appear below in the streams and in the lake. The causes of this class of pollution are evident and the responsibility direct.

With the second group, however, the relations are more complex and the responsibility less direct. The problem presented is: Given stated kinds and amounts of refuse materials discharged from the mills and stated observed conditions of vegetation, decomposition, deposits and odors along the streams and the lake, to what extent, if any, are these observed conditions the result of the discharge of the refuse stated? It is quite evident that the question is mainly a biological and chemical one, involving as it does the identification, life history and the conditions which favor and hinder the development of the various organisms observed, as well as the production of the chemical products and conditions found to exist at certain times and places.

This fact being appreciated and the identity of the deposits on the stones along the lake shore with pulp from the Willsboro mills being strongly claimed, samples of sheet pulp from this mill, together with samples of deposits and stones containing the deposits and coatings were sent to Dr. Willis G. Tucker, Chemist of the State Department of Health, with the request to report as to the identity of the two classes of materials and also on the nature of the deposits. Dr. Tucker's report on this matter, dated August 14, 1903, is hereto appended as "Exhibit I." I also secured your authority to submit the question of the relation between the mill refuse and the rank development of organic life along the lake shore to Dr. G. C. Whipple, a well known sanitary biologist of New York, who until recently was the director of the Mt. Prospect Laboratory of the New York water department, and formerly biologist of the Boston water works. Dr. Whipple made an inspection of the streams and the lake during this month, collected and examined many samples furnished him by me, gathered on my previous inspection trips. His report on his examinations is expected soon and will be appended to this report when received.

Leaving for Dr. Whipple the discussion of the direct influence of each of the several kinds of refuse material discharged from the mills—a topic which he will doubtless cover in his report—

one or two other sources of information bearing on this question of the relation between the refuse discharged and the pollution observed may profitably be considered. The first relates to the development of the observed objectionable conditions in the past. From the beginning of this inquiry an effort has been made to secure the testimony of reliable, unbiased persons of long familiarity with the lake on the matter of its conditions in the past, particularly during the time prior to the establishment of the two mills concerned and during their earlier years.

While the statements thus secured are somewhat discordant, the preponderance of evidence from this source indicates very emphatically that although the development of the aquatic vegetation along the lake shore was observed many years ago, the frequency of its occurrence in noticeable amounts and the extent of the growth has been of late years very materially increasing and was never so frequent and rank as now.

The second relates to the possible effect of other sources of pollution than the two mills concerned in this inquiry. There is another soda-ash pulp mill at Ticonderoga on the outlet from Lake George, tributary to Lake Champlain near its head. As this mill was not included in my instructions covering this investigation, I have not inspected the conditions at this mill, but I am informed, from what appears a reliable source, that the waste from this mill is thoroughly retained and not allowed to escape into the stream. The natural pollution from the population on and tributary to Lake Champlain has frequently been offered as a probable source of food supply for the algae and other forms of aquatic life complained of. Undoubtedly this is true, but when it is understood that if all the domestic sewage from the total entire population of Burlington, Plattsburg, Whitehall, Port Henry, Ticonderoga, Port Kent, Crown Point, and the smaller villages on the lake, as well as that from Lake Placid, Elizabethtown, Keeseville and Au Sable Forks, was discharged into the lake, the total of the dry weight of this domestic sewage would be less than one fifth that of the dry weight of the refuse from the two mills concerned. As a matter of fact, only a fraction of the total sewage of the above named populations ever reaches the lake or any stream. Of course, pound for pound, this sewage would be much more dangerous as a means of conveying

water-borne diseases, but it would be a less favorable food supply for algae than the carbonaceous matter from the mill wastes.

June 25, 1904.

The report of Dr. G. C. Whipple on his inspections and examinations of the local conditions and the samples gathered and furnished him has just been received and is appended hereto as "Exhibit M." Dr. Whipple covers the ground very thoroughly, considering the amount of time he was authorized to devote to the examination. His report is so clear as not to require explanation or comment.

CONCLUSIONS.

As a result of this investigation I beg to submit the following as my conclusions:

(1) The natural pollution from the population residing on the drainage areas of the Bouquet and Au Sable rivers is not an important factor in the conditions complained of.

(2) The carbonate of lime, bleach-sludge, black-ash waste, etc., aggregating upward of 44,000 pounds per day or 15,000,000 pounds per annum (dry weight), discharged from the Willsboro mills of the New York and Pennsylvania Company are not properly retained in the present sludge basin, and this sludge basin is not constructed in accordance with the agreement entered into on February 12, 1901, between the New York and Pennsylvania Company and the State Forest, Fish and Game Commission, as a basis for the withdrawal of an action by the said commission against the said company.

(3) The effect of the black-ash waste, wood refuse and cinders which are discharged or allowed to escape from this mill appears to be confined mainly to the river at its mouth and to the lake shore immediately adjacent, although the slow decomposition of the wood refuse undoubtedly contributes, along with the black-ash waste, to the stock of carbonic dioxide, which is the chief source of food for the vegetable life which thrives abundantly along the lake shores.

(4) The large amount of carbonate of lime discharged from this mill in its impalpable form as a precipitated chemical appears to be carried to considerable distances from the mouth of the

river, and within the region of its transportation appears to impair the quality of the lake water for potable purposes.

(5) No fiber or pulp from the Willsboro mills was discovered in the lake shore deposits, which form one of the chief grounds of complaint.

(6) The extensive accumulations and deposits of offensive material along the lake shore at nearly all points examined are due to the decomposition of masses of aquatic micro-organisms—vegetable by classification—mainly consisting of different species of green algae and diatoms. The gray or whitish coating on the rocks and stones, giving the light banded appearance along the lake shore above water line, is due to the drying and bleaching out of this organic matter, intensified to some extent by mineral matter entrained by it, apparently siliceous matter and carbonate of lime.

(7) Dr. Whipple sees no reason to believe that the waste products from the Willsboro mills contribute materially to the growth of the algae on the shores of the lake.

(8) The discharge of refuse sulphite liquor, lost fiber and other wood waste from the sulphite pulp mills of the J. & J. Rogers Co. at Au Sable Forks, amounting to at least 171,000 pounds per day or about 60,000,000 pounds per annum (dry weight) is the cause of serious pollution not only in the Au Sable river, but in the lake.

(9) The pollution of the Au Sable river from the sulphite pulp mills at Au Sable Forks discolors the water, gives it a strong odor which is offensive to many people, fouls the banks, has seriously injured the public water supply of the village of Keeseville, and renders the river water generally unfit for domestic purposes.

(10) The refuse discharged into the river from the mills is, for the most part, carried into the lake partly throughout the year and partly at times of freshet. Settling and accumulating on the bottom, being mainly organic woody matter, it contributes materially by its decomposition to the stock of plant food for the algae and other micro-organisms, which form the chief ground of complaint concerning the lake shore.

(11) The accumulations and deposits of decomposed organic matter along the lake shore are detrimental, not only through

the production of objectionable odors and the injury to the potability of the lake water when carbonate of lime deposits are washed up, but also in the serious defacement of the shore and of boats and docks.

(12) The discharge of all solid refuse from the Willsboro mills can be entirely avoided, without unreasonable cost, by either of two plans. First, by the reconstruction or improvement of its present sludge basin, rendering it water-tight and safe against injury or inroads from high water and ice, so that the basin should at all times remain crest-full of liquid waste, thus giving an opportunity for complete sedimentation of the solid matters until the basin becomes nearly filled with solid matter, which it should do at the rate of upwards of 8,000 cubic yards per annum. When this basin becomes filled with solid matter it would then be necessary to construct a new one. The second or alternate plan would be to reconstruct or improve the present sludge basin as in the above plan, but to relieve it of the burden of storing up the carbonate of lime, which represents by far the greater part of the refuse, by installing and operating at the mills a suitable process for the recovery of lime from the waste carbonate of lime. I do not know of any really serious obstacle to the use or success of such a process, which should, if reasonably successful, recover a large proportion of the lime needed for the causticising of the soda-ash, and at a cost not much, if any, greater than for the present supply of lime, with the advantage of thus taking care of the largest item of refuse. There may be obstacles or reasons against the introduction of this second plan of which I am not aware, but in any event the first plan is beyond question feasible.

(13) The discharge of refuse sulphite liquor, lost fiber and other wood waste from the sulphite mills at Au Sable Forks can also be avoided, and at a cost which at the worst would not be prohibitory. Even if the company should not succeed in developing a system whereby it might recover as waste products some of the woody materials now lost, it is still feasible to devise a system by which the refuse liquor may be evaporated and its solid constituents burned along with the other forms of wood waste, and at a cost which would not be prohibitory to operate.

(14) The discharge of sewage from the several municipalities on the lake and on its tributary streams constitutes an element

in the development of the objectionable aquatic growths along the lake shore, though less extensive than the discharge of pulp-mill refuse, and it also presents an element of danger to the potability of the water of the lake.

RECOMMENDATIONS.

Following the above conclusions, I beg to submit for your consideration the following recommendations:

(1) That the New York and Pennsylvania Company be required, under section 6 of the Public Health Law, or under other general authority, to permanently discontinue and cease—within a reasonable length of time from the date of notification—the discharge or the escape from its Willsboro mills of all lime-sludge, bleach-sludge, black-ash waste, lost fiber, wood waste, cinders, and all other forms of pulp mill waste, into the Bouquet river or any tributary stream, or into Lake Champlain.

(2) That the J. & J. Rogers Co. be required, under section 6 of the Public Health Law, or under other general authority, to permanently discontinue and cease—within a reasonable length of time from the date of notification—the discharge or escape from its pulp and paper mills at Au Sable Forks of all waste sulphite liquor or washings, and all lost pulp, wood waste, paper mill waste, bleach-sludge and all other forms of pulp mill and paper mill refuse, into the Au Sable river or tributary stream, or into any place where it may find its way into the said river or tributary stream.

(3) That in view of the importance of the purity of the waters and the shores of Lake Champlain and Lake George, the laws, regulations and authority of this Department, relating to the discharge of sewage into public waters, be strictly enforced with regard to these lakes and all tributary streams.

(4) That if, upon investigation by this Department, it shall be found that the pulp mills at Ticonderoga are discharging or are allowing to escape into any stream pulp mill refuse of any kind, the same orders be issued to the owners and operators of these mills as are recommended above for the Willsboro mills.

I append hereto a list of the exhibits accompanying this report and beg to take this occasion to express my thanks to all the

gentlemen who, by assistance or information, have aided me in this investigation.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer, State Department of Health.

LIST OF EXHIBITS.

Exhibit A.—Copy of a letter of David Gray, attorney, addressed to Hon. W. Austin Wadsworth, President Forest, Fish and Game Commission, concerning a proposition from the New York and Pennsylvania Company to settle an action brought by the Forest, Fish and Game Commission against the company for pollution of the Bouquet river and Lake Champlain.

Exhibit B.—Copy of a memorandum concerning agreement to settle the above action.

Exhibit C.—Copy of a stipulation signed by the attorneys of the two parties in the above action.

Exhibit D.—Copy of letter from general manager of the New York and Pennsylvania Company addressed to the superintendent of the Champlain mills of that company, authorizing him to act for the company in the settlement of the above action.

Exhibit E.—Copy of agreement reached in the above action, with specifications of the changes and improvements which the defendant company agrees to make at its mills at Willsboro.

Exhibit F.—Copy of a sketched map accompanying the above agreement.

Exhibit G.—Copy of letter from J. F. Shedden, Fish and Game Protector, to J. W. Pond, Chief Game Protector, Albany, reporting on his inspection of the work carried out by the New York and Pennsylvania Company under the above-named agreement.

Exhibit H.—Copy of letter from Mr. T. A. Stuart, Acting Commissioner of Health, to Olin H. Landreth, Consulting Engineer, transmitting report of Dr. Willis G. Tucker, Chemist State Department of Health, on his examination of samples from the shores of Lake Champlain.

Exhibit I.—Copy of the above mentioned report of Dr. Willis G. Tucker.

Exhibit J.—Copy of petition to the State Department of Health, Albany, N. Y., concerning the pollution of the Au Sable

river by refuse discharged from the J. & J. Rogers Co.'s pulp mills at Au Sable Forks; signed by riparian owners along Au Sable river.

Exhibit K.—Affidavit of Mr. James Baggs, of the town of Peru, Clinton county, regarding illness in his family alleged to be due to the use of polluted water taken from the Au Sable river.

Exhibit L.—Affidavit of George Bell, employee of Mr. James Baggs, of Peru, Clinton county, concerning the taking of the above mentioned water from the Au Sable river and his illness, alleged to be due to the use of the same.

Exhibit M.—Copy of the report, dated June 23d, of Dr. G. C. Whipple, Sanitary Biologist, concerning his inspections, examinations and analyses in his investigations of the pollution of the Bouquet river and Lake Champlain.

Exhibit "A."

(Copy.)

BUFFALO, N. Y., *February 1st*, 1901.

W. AUSTIN WADSWORTH, Esq.,

President, Forest, Fish and Game Commission,

MY DEAR SIR:—

Overtures have been made to me looking to a settlement of the suit now pending against the New York and Pennsylvania Company. On Wednesday, January 30th I met Mr. Mason the superintendent of the Willsboro Mill in Albany and discussed the situation. Mr. Mason was under the impression that his company was the victim of something in the nature of a persecution. I corrected his views in this regard and pointed out that the Commission's only aim was to correct the conditions existing in the Willsboro end of the Bouquet river.

While he was unauthorized to make any definite proposition a proposal of this nature was set forth:

1. The company should pay a fine upon one of the causes of action brought against it.

2. The company should prepare a plant directly the ice is out of the river for holding the lime and all solid matter of a chemical nature discharged from the mill.

3. The company should by agreement in writing bind itself to maintain this plant to the satisfaction of the Commission and

should at once file specifications as to its construction with the Commission.

The plant which Mason proposed, contemplates a stone dam across the narrow branch of the river between the mainland and the island, and a system of log or gravel dams at the foot thereof and at the mouths of two or three small streams that drain the territory. The result would be to give a considerable acreage of low lying land upon which the refuse could be run and be secure from the action of the ice and high water in the spring. He offered to locate the plant upon the opposite bank upon the flats which I have already spoken of to the Commission but showed me that a larger acreage could be secured in this way, and I believe that with the proposed dams the island and the adjoining shore of the mainland would be better. This improvement would probably cost from $1,000 to $2,000.

My personal opinion is that such a settlement would secure all which the Commission undertook to accomplish and more than would necessarily result from prosecuting the action; since even if we succeed, the Company is not bound to make an effective permanent arrangement for its refuse. Please let me know the Commission's views upon the matter at your earliest convenience. It is perhaps unnecessary to point out that by a settlement we shall save the State the expense of a trial which would be a somewhat elaborate affair.

Yours very truly,

DAVID GRAY.

Exhibit "B."

(Copy.)

March 1st, 1901.

IN THE MATTER OF THE SETTLEMENT OF THE ACTION ENTITLED
THE PEOPLE OF THE STATE OF NEW YORK
AGAINST
THE NEW YORK AND PENNSYLVANIA COMPANY.

This action was brought by David Gray as attorney for the Forest, Fish and Game Commission. The summons was served December 10th, 1900, and the amended complaint later in the month. The answer was served by mail on January 25th, 1901.

The annexed memorandum of agreement, specifications and drawing define the conditions to which the New York and Pennsylvania Company has acceded as a consideration for settling the action. The improvement contemplated is to be performed with all reasonable speed as soon as weather and water permits in the spring of 1901 at Willsboro.

A stipulation for an order discontinuing the action was signed by Rowe and Pyrke, attorneys for the defendant under date of February 26th, 1901.

Copies of the originals of all the papers in the action and settlement are filed herewith.

Yours truly

DAVID GRAY

Attorney for Plaintiff.

953 Ellicott Square, Buffalo, N. Y.

Exhibit "C."

(Copy.)

SUPREME COURT: ESSEX COUNTY.

The People of the State of New York,

Plaintiff,

against

The New York and Pennsylvania Company,

Defendant.

It is hereby stipulated by and between the parties to the above entitled action that the same be discontinued without costs to either party in consideration of an agreement made by the defendant and filed with the New York State Forest, Fish and Game Commission whereby the defendant is bound to construct and maintain a suitable plant for the abatement of the pollution of the Bouquet river at and below the village of Willsboro, Essex county, New York; and it is further stipulated that an order of discontinuance may be entered by the defendant hereto without notice.

Dated Feb. 26, 1901.

DAVID GRAY

Attorney for the Plaintiff.

953 Ellicott Square, Buffalo, N. Y.

ROWE & PYRKE

Attorneys for the Defendant.

Exhibit "D."

(Copy.)

NEW YORK, *Feb. 8th,* 1901.

MR. R. L. P. MASON, *Supt.*
New York & Pennsylvania Co.,
Willsboro, N. Y.

DEAR SIR:—

You are hereby authorized to act in behalf of this company in reaching a settlement of the suit brought by the Fish Commission, represented by Mr. Gray.

Yours very truly,
NEW YORK & PENNSYLVANIA CO.
by
A. G. PAINE, JR.
General Manager.

Exhibit "E."

(Copy.)

CHAMPLAIN MILLS.
NEW YORK AND PENNSYLVANIA CO.,
New York Office Times Building.
WILLSBORO, N. Y.

PROPOSED CRIB WORK AND DAMS FOR THE RETENTION OF SLUDGE TO EFFECT A PRACTICAL REMEDY FOR THE POLLUTION OF THE BOQUET RIVER AT WILLSBORO BY THE NEW YORK & PENNSYLVANIA COMPANY, AS SUGGESTED BY THE FISH, FOREST AND GAME COMMISSION.

The New York & Pennsylvania Company hereby agrees to erect with all reasonable speed in the spring of 1901, as soon as the frost is out of the ground and the height of water in the river will permit in a substantial and lasting manner according to the following specifications:

One breakwater from a point on the east side of the river known as "The Old Forge Bank" in a direction about 20 degrees east of north; said dam or breakwater to be 140 feet long, (be the same more or less) south half of stone to be 5 feet in height

at the deepest point 3 feet wide on top and 5 feet on the bottom. Breakwater to be curved with the proper slant for throwing off ice, logs, etc., stones to be laid in Portland cement and locked; centre to be keyed. North part to be built of logs, no sticks less than 8 inches, in the form of a crib with 4″ planked face; crib to be filled with stones, and have post anchors in each corner. If found necessary the south or upper half of stone dam will be sheathed.

One earth embankment duly cribbed at a place marked "A" on sketch.

One 31 foot dam at a place marked "B" of sufficient height to prevent back flow from the lake and hold lime and bleach sludges. Dam to be built of 10 inch timber stringers, 8 inch binders and to be anchored 5 feet in each bank. Fastenings of ¾ inch round iron; every cross timber tied to horizontal; crib work weighted with stones and banked with sand; post anchors on each side end section; planked two thickness 2-inch plank. Slant of curving approximately 35 degrees. Said dams will form an area of approximate dumping capacity of ten acres, more or less. Said dumping ground will be protected and maintained as per enclosed sketch and outlined plan, if satisfactory to the Fish, Forest and Game Commission.

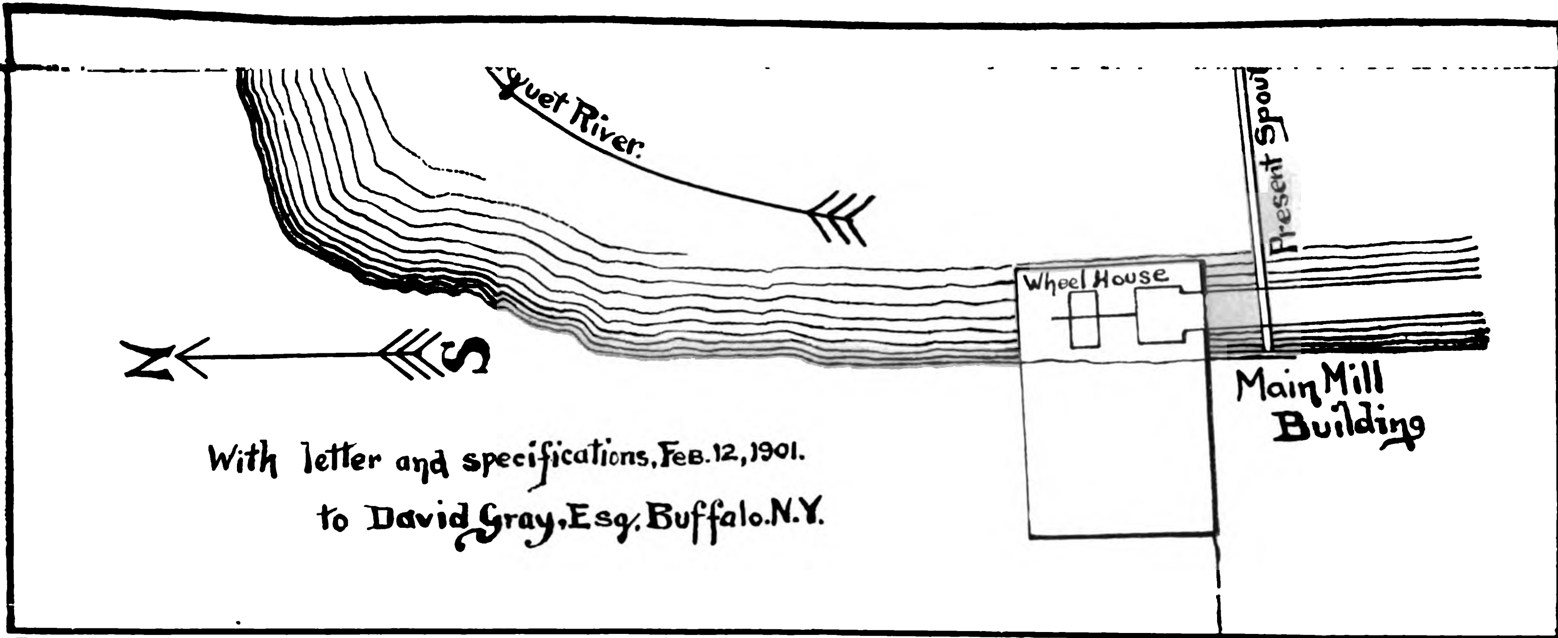
Provided the New York & Pennsylvania Company are unable to secure control of this tract for reasons given by Mr. Gray this company agrees to erect sufficiently large settling chambers on the north side of the river on the low lands and to be as satisfactory as the above proposed plan.

If other dams, cribs or embankments are found to be necessary to perfect the plan such dams, cribs or embankments will be constructed and maintained by the New York & Pennsylvania Company in the same manner as those above described.

NEW YORK & PENNSYLVANIA COMPANY.
By ROBT. L. P. MASON,
Supt.

Approved
FOREST, FISH AND GAME COMMISSION,
By
W. A. WADSWORTH,
President Forest, Fish & Game Commission.

Dated Feb. 12, 1901.



...uet River.
Present Spout
Wheel House
Main Mill
Building
S
N
With letter and specifications, Feb. 12, 1901.
to David Gray, Esq. Buffalo. N.Y.

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Exhibit "G."

(Copy.)

MOOERS, N. Y., *Oct. 7th,* 1901.

J. W. POND,
Chief Protector,
Albany, N. Y.

DEAR SIR:—

In compliance with yours of the 2nd inst. I hereby most respectfully submit the following:

I have made a thorough and careful survey of the work done by the N. Y. & P. Co. at Willsborough, N. Y. supposed to be in accordance with agreement of which you send copy.

1st, At the point on east side of river where agreement calls for a *stone* dam from the old forge bank in a direction of 20° east of north &c. there is a structure of crib work 152½ ft. in length, 3 ft. & 2 in. wide on top and 5 ft. on bottom built of timber and planked vertically on the river side with 2 in. pine filled with stone and no sheathing on top.

2nd, The north one half of said breakwater is constructed exactly the same as the south part and is 155½ ft. long about one half of which has been filled with stone and all unfinished.

3rd, I find no earthwork, embankment or other structure at the point marked "A." on the map. At the point marked "B" there is no dam but there is a structure about 20 rods below built to take the place of proposed dam "B" which is 110 ft. long, 7 ft. wide, crib style (said to be filled with sand & stone) planked vertically on each side with 2 in. lumber and none on the top—whether constructed in accordance with plan set forth in 3rd paragraph of contract is impossible to say without digging away the sand.

I would say further all work on said breakwaters or dams is at a standstill.

Respectfully,

J. F. SHEDDEN,
Fish & Game Protector.

Exhibit "H."

(Copy.)

ALBANY, N. Y., *August 15th,* 1903.

Prof. OLIN H. LANDRETH,
Consulting Engineer, State Dept. of Health,
Schenectady, N. Y.

DEAR SIR:—

I enclose herewith, for your information, copy of a report made by Prof. Willis G. Tucker, upon his examination of samples of stone, also of loose material and pulp collected by you and submitted to Professor Tucker for examination.

Very respectfully,
T. A. STUART,
Acting Commissioner of Health.

Exhibit "I."

(Copy.)

ALBANY, N. Y., *August* 14, 1903.

T. A. STUART, Esq., *Acting Commissioner,*
N. Y. State Department of Health, Albany.

DEAR SIR:—

Referring to the "Samples of stones, also of loose material and pulp" submitted by Prof. Olin H. Landreth, C. E., and received by me on July 9 last, of which an examination was directed with a view to determining the nature of the coating upon the stones and of the loose material, I would report that, in my opinion, no chemical examination is likely to give a satisfactory answer to the question which I understand to be involved in this case,—viz: whether the deposit results from the discharges of manufacturing waste from certain mills in the vicinity of Lake Champlain from the shores of which the stones were taken. The matter therefore lies outside of my line of work, but I have made a microscopic examination of the samples submitted, including the sample of pulp, and have compared these with other samples of similar material. The pulp mainly consists of clean, twisted and more or less interlacing fibres, and it is of very uniform structure. The coating upon the stones consists of vegetable debris, siliceous

particles and unidentifiable material, and, so far as observed, is similar in its nature in each case, excepting that the deposit upon the stone marked No. 4* consists more largely of mineral, apparently siliceous, particles. I am unable to identify with certainty any wood fibres or fragments of wood in the coating upon any of the samples examined and do not feel justified in saying that this material is of the nature of the matter composing the sample of pulp submitted with the samples.

Very respectfully yours,
(Signed) WILLIS G. TUCKER,
Director.

Exhibit "J."

(Copy.)

To the State Department of Health,
Albany, N. Y.

The Petition of the undersigned, residents and taxpayers and riparian owners of Clinton & Essex counties, New York State, respectfully shows:

I. That the Au Sable River flowing in and between the counties of Clinton & Essex, N. Y., from the beginning of time up to about 12 years ago was noted for the purity of its waters, which, as a potable water, was unsurpassed in the Adirondack region.

II. That fishing, boating and hunting, the unusual attractiveness of its natural beauty, as it flows through the remarkable and world renowned Au Sable Chasm, made it a point of interest to thousands of summer tourists.

III. That passing on six miles, the river empties into historic Lake Champlain, which is now an attractive summer resort and bids fair to become in the future the abode of many men in the quest of summer homes and recreation.

IV. That said river is now thoroughly polluted by certain sludge acid and by certain other refuse discharged from the J. & J. Rogers Pulp Mill at Au Sable Forks, 12 miles above the village of Keeseville.

V. That your Petitioners beg to submit the Twentieth Annual Report (February 15, 1900) Section 407, page 174 of your Hon-

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*Stone No. 4 came from the lake shore near Mr. A. H. Ellis' on Willsboro Point.

orable Board and are obliged to state that the conditions are much more serious than they were at that time and are now as follows, to wit:

The discharge from said mill discolors the water, kills the fish, gives rise to unhealthy and offensive odors, pollutes and poisons the water rendering it unfit for agricultural and domestic purposes, constituting a continual nuisance.

VI. That the owners of said mill, admit the pollution of said water by said discharges of their mill, and have promised again and again to make provision for the disposal of said refuse, but nothing has been done.

Your petitioners therefore pray that your Honorable Board will exercise the power, in you invested by law, to examine into the matters aforesaid, with the view of abating the nuisance aforesaid, and will then without delay abate and remove the same.

And your Petitioners will ever pray.

Dated May 23, 1903.

Riparian Land Owners Au Sable River.

Walter B. Giddings	1/3 mile below the chasm
Harrison Carpenter	3 miles below the chasm
James Baggs	3 miles below the chasm
James Baggs, Jr	3 miles below the chasm
Charles Giddings	mouth of Au Sable river
Henry W. Thompson	2½ miles below chasm
Galen Stafford	1 mile below chasm
Loring E. Church	1 mile above mouth of river
Grant Carpenter	2 miles below chasm
E. F. Hayes	1 mile above Keeseville
John McGinn	Commercial House

Exhibit "K."

(Copy.)

STATE OF NEW YORK: } ss.
COUNTY OF CLINTON. }

James Baggs being duly sworn says, I reside in the Town of Peru said county & state and on the banks of the Au Sable

River about three miles below Au Sable Chasm as said river winds and turns and about two miles above the mouth of said river. That on the 11th day of May 1903 instant the well at my house gave out on account of drought and quicksand and flowing into said well so that I could not get water from said well to use for family purposes, and one George Bell who is & was on said 11th of May in my employ as I am informed & verily believe procured one pail of water from said Au Sable River and drank of said river water and I and my wife, Sarah Baggs, my sons James Baggs, Jr. and Henry Baggs and said Bell as I am informed & verily believe all drank of said river water, and I became sick a short time after drinking said river water. I had dull heavy pains in my stomach and through my bowels and I have been unwell ever since said 11th May inst. by reason of the drinking of said river water.

JAMES BAGGS.

Sworn to & Subscribed before
me May 22, 1903
S. E. MADERS,
Notary Public Essex County.
Ctf. filed Clinton County.

Exhibit "L."

(Copy.)

CLINTON COUNTY, ss.

George Bell, being duly sworn says, I have heard read the foregoing affidavit signed & sworn to this day by said James Baggs. I did on the said 11th day of May 1903 inst., draw a pail of water from the Au Sable River for the use of said Mr. Baggs' family as stated in his affidavit and I drank of said water and immediately thereafter had cramps and pains in my stomach and bowels and was unwell during the remainder of that day after drinking said water.

GEORGE BELL.

Sworn to & subscribed before
me May 22, 1903
S. E. MADERS,
Notary Public Essex County.
Ctf. filed Clinton County.

Exhibit "M."

ALLEN HAZEN, M. AM. SOC. C. E. GEORGE C. WHIPPLE, ASSOC. M. AM. SOC. C. E. CONSULTING ENGINEERS, ST. PAUL BUILDING.

NEW YORK, *June* 23, 1904.

PROF. OLIN H. LANDRETH,
Consulting Engineer,
Schenectady, N. Y.

DEAR SIR:

In your letter of May 6, 1904 you requested me to make an inspection of the conditions along the shore of Lake Champlain and report on the relation between the artificial pollution of the lake by the mills at Willsboro and Au Sable Forks and the occurrence of the objectionable forms of water vegetation observed along the shore near the mouths of these rivers.

I beg to report that in compliance with your request I visited Lake Champlain on May 13, 1904, and examined the algæ growing on the shore between Willsboro Point and the Bouquet river, as well as that found on the shores of the Four Brother Islands. I also visited the pulp mill of the New York & Pennsylvania Company at Willsboro and examined the Bouquet river above and below the mills, and at several places between Willsboro and Lake Champlain. Time did not permit me to visit the mills at Au Sable Forks, but I am generally familiar with the process said to be used there. I have also received from you, and have carefully examined, many valuable data and samples bearing on the amount and character of the mill wastes, algæ growths, mud deposits, etc.

My general conclusions from the investigation are as follows:

The growth of the algæ on the shores of Lake Champlain in the vicinity of Willsboro Point is due chiefly to natural causes, and is influenced only to a slight extent by the discharge of the pulp mill wastes. The character of the wastes from the Willsboro mills, where the soda process is used, is such that its effect on the growth of algæ cannot be considered as material, although some of the waste products put forth are usable as food by the algæ. The character of the wastes from the mills at Au Sable Forks, where the sulphite process is used, is capable of affecting the algæ to a much greater extent, and may be an important local contributory factor in stimulating their growth.

On the day of my inspection I found the shore between Willsboro Point and the Bouquet river to be quite generally covered with a thick growth of Conferva, chiefly that species known as Conferva floccosa. This plant is one of the green algæ, or Chlorophyceae. It grows in the water, as does sea-weed, attached to rocks, stones, wooden piers, logs, etc., and covers them with a brilliant green, mosslike mat of minute filaments, which vibrate with the waves. It was found especially abundant on the rocky portions of the shore where the depth of water was less than about three feet. The growths rarely extended to depths greater than that. It was not found on the sandy or pebbly shores, where the frequent rubbing together of the particles, caused by the waves, prevented its finding a lodgment. Nor was it found on the sandy flats at the mouth of the Bouquet river, for the same reason. In the region visited, by far the greater part of the shore was found to be covered with this unsightly algæ. In places a green streak on the rocks at the water-line could be observed several hundred feet away. If the plant remained always green it would not be so unattractive, but on decaying it turns brown and gas bubbles are evolved, giving a frothy appearance to the mass, while in extreme cases the odors of decomposition may become noxious. At times, when the wave action is severe, masses of decayed algæ may be scattered through the water, and on account of their buoyancy, due to their structure and the gas bubbles entrained, they float on the water as dirty brown patches. Such patches were seen at various places near the shore, and they were especially numerous near the mouth of the Bouquet river. Most of the floating masses, however, were composed of Spirogyra and Oscillaria instead of Conferva.

As the lake level lowers the Conferva on the exposed rocks dries into a tough fibrous coating, which at times can be lifted from the stones in sheets of considerable size and thickness. This dried material somewhat resembles papier-maché. When Conferva alone is present the sheets have a silky appearance, but when diatoms are also abundant they become friable and are occasionally ground to a fine powder. When the film is wet by the water splashing up on the shores, the rocks become quite slippery. The thickness of the mat, that is, the length of the Conferva filaments, varied from one to three inches. Under the

microscope each filament was found to be composed of a row of short cylindrical cells placed end to end, and about 0.02 millimeter in diameter. The filaments were unbranched. The plant propagates by means of zoospores. These after floating through the water become attached to the rocks and develop into filaments which grow by continued division of the cells in one direction. There is a gelatinous substance which surrounds these rows of cells, and this it is which gives the slimy character to the growth. When the green alga is crushed with the fingers it emits a strong, fishy odor, and its taste is oily and fishy. On decay the odor becomes very offensive.

Aside from the objectionable features above mentioned,—it cannot be denied that the presence of this alga on the rocks detracts greatly from the beauties of the lake shore,—I know of no practical objection to it from the sanitary standpoint. While it is a nidus for many forms of microscopic life, such as diatoms, desmids, various protozoa, besides animal organisms of a larger size, it would not be a nidus for the germs of waterborne diseases, as some have claimed. In fact, its tendency would be to destroy them.

Besides the Conferva floccosa, which formed the bulk of the algæ growth on the stones near the waterline, other filamentous algæ were found, namely, Spirogyra and Oscillaria. These were frequently observed as floating masses, and they were found growing upon the shores of Boquet river and on the shores of the lake near the river's mouth. The two genera were found growing together with filaments intertwined. No Conferva floccosa was found on the shores of the Bouquet river, but the inspection was not sufficiently extensive to prove its complete absence from that vicinity. The Spirogyra and Oscillaria probably occur at intervals along the shore, especially in the coves. These algæ form longer filaments than does the Conferva floccosa, and these are more easily broken off by the wave action; hence their appearance as floating masses. They also are able to grow at somewhat greater depths in the water.

Some of the films examined contained masses of diatoms. Of these Fragilaria was the most prominent genus, but Navicula, Synedra, Melcsira, Gomphonema, and many others were found. Desmids and other unicellular algæ were also present, as well as some of the protozoa, crustacea, etc.

The samples collected by you in 1903 agreed in their essential features with those collected by me, and showed that the material taken from the lake shore was composed chiefly of masses of Conferva and films of diatoms.

The conditions necessary for the growth of Conferva, Spirogyra and similar filamentous fresh-water algæ are sunlight, a warm temperature, a suitable foot-hold, a certain amount of agitation of the water, and a sufficient supply of food material, including oxygen, carbonic acid and various mineral salts. Whether or not Conferva requires the presence of organic matter in solution is, so far as I know, unknown. Some of the filamentous algæ are known to thrive in water which contains almost no dissolved organic matter, if carbonic acid be present.

The need of sunlight limits the growth of Conferva to depths not exceeding three or four feet, because the sun rays, while they penetrate to greater depths, lose their actinic power very near the surface of the water.

Conferva thrives best in moderately warm water. This was illustrated by the variations in the growths observed along the shore on the day of my inspection. There was observed a tendency for the heaviest growths to occur on those portions of the shore where the water was comparatively shallow and where rock surfaces were presented to the sun's rays. The temperature observations made that day (May 13th) at the surface of the lake varied from 40° to 60° Fahr. At 9 A. M. the temperature of the water at Ellis's boat landing was 40°, while at 4 P. M. it was 57°. The day was very calm and the water surface unruffled; consequently the surface water warmed up rapidly. In rowing along the shore, with a thermometer trailing in the water near the surface, it was easy to detect those spots where the water warmed quickest. At times variations of 5° or more were found at points less than a rod apart.

Filamentous algæ, like Conferva, grow most luxuriantly where they can obtain an undisturbed foot-hold, as on submerged woodwork, rocks, etc. They are not found on muddy, sandy or gravelly shores unless the water is calm.

The subject of the food supply of the algæ is the one with which this report is most immediately concerned. The principal chemical elements involved are carbon, oxygen, hydrogen and nitrogen, with smaller quantities of sulphur, phosphorus, silica, magnesium,

iron, potassium, etc. Oxygen may be left out of the discussion, as the natural conditions existing along the lake shore are such as to supply all the oxygen required by the algæ. The amount of dissolved oxygen in the surface water around the shore is probably always near the point of saturation, unless perhaps during the winter when the ice covers the lake. The carbon used by the plants is acquired largely from dissolved free carbonic acid, and this is in turn derived largely from organic matter which has undergone bacterial decomposition. Nitrogen is acquired chiefly from the nitrates present in the water, although in some instances aquatic plants have the power of taking it from the free ammonia dissolved in the water, and it is quite possible that some plants, living symbiotically with certain bacteria may even utilize dissolved free nitrogen. The nitrates must be looked upon as the chief source, however, and these are the result of complete bacterial oxidation of organic matter. The carbonates, sulphates and phosphates, potassium, magnesium, iron,etc., which are also needed by the algae, are almost always present in surface waters in quantities sufficient for their growth. The calcium salts are thought to be of less importance for the growth of algæ than for the higher plants.

The amount of dissolved free carbonic acid in lake waters depends upon the carbonic acid tension of the atmosphere, the quiescence of the water, and the amount of decomposition of organic matter taking place in the lake. Ordinarily near the surface the amount of CO_2 is from 1 to 3 parts per million by weight. On the day of my inspection I determined the CO_2 at various places in the lake. It varied from 0.7 to 1.9 parts per million, and averaged about 1.5. Half way between the Four Brothers Islands and the shore it was 1.7. At the mouth of the Boquet river it varied from 0.7 to 1.1. A sample of water taken just above a growing mass of Conferva contained no carbonic acid, the plants having exhausted the supply; two feet away there was 0.7 part, and ten feet away, 1.9 parts. In the Boquet river about half a mile below the Willsboro mills the water contained only 0.3 part per million CO_2, and just below the sedimentation basin there was none present. The effect of the discharge of soda or of lime mud (calcium carbonate) would be to diminish the amount of free carbonic acid in the water.

Much of the free CO_2 found in the water of lakes is derived from decomposition of organic matter at the bottom, especially during those periods when the water there is stagnated by reason of thermal stratification; i. e., during the summer or winter. These stagnation phenomena occur in most deep lakes. To what extent they occur in Lake Champlain I do not definitely know. In June, 1895, however, the water in the middle of the lake opposite Essex was thermally stratified, and a sample collected at the bottom of the lake at the same point was clear, almost colorless and odorless, while a sample of the deposit at the bottom showed clean, gravelly material. The temperature observations were made by me, using the thermophone, and, as they have never been placed on record, I append a copy hereto.

It is quite probable that at other parts of the lake deposits of organic matter exist, which would cause decomposition at the bottom, during periods of summer or winter stagnation. Anything tending to increase these deposits would thus tend to increase the algæ growths on the shores. The woody fibre discharged from the pulp mills, if it settled to the bottom, would act in this direction. In the absence of air, cellulose even may undergo decomposition and yield CO_2. The influence of bottom decomposition on the amount of dissolved free CO_2 in lake water was well illustrated by observations made in Lake Cochituate in 1901.*

During the summer stagnation period CO_2 accumulated at the bottom and was carried to the surface after the autumnal overturn of the water. Thus:

AMOUNTS OF FREE CO_2 IN PARTS PER MILLION

Depth in feet.	Oct. 11, before the overturn.	Nov. 14, after the overturn.
1	2.6	6.0
10	3.0	
20	10.0	
30	11.0	6.0
40	11.0	
50	19.0	
60	23.0	6.0

*On the Amount of Oxygen and Carbonic Acid Dissolved in Natural Waters, and the Effect of these Gases upon the Occurrence of Microscopic Organisms. By G. C. Whipple and H. N. Parker. Trans. Am. Micro. Soc. May, 1902.

Next in importance is the nitrogen. This occurs in natural waters in four forms, namely, as part of organic compounds (i. e., as "albuminoid ammonia"); as ammonium salts ("free ammonia"); as nitrites or nitrates, these forms representing successive stages in the decomposition of organic matter. It is chiefly in the form of nitrates that it is available as plant food.

A sample of water collected on May 13th, six feet below the surface of the lake, at a point about half way between the Four Brothers and Willsboro Point, contained nitrogen as follows:

	PARTS PER MILLION
Albuminoid ammonia	0.094
Free ammonia	0.002
Nitrites	0.000
Nitrates	0.400

Samples collected on May 13, from above and below the mills at Willsboro, gave the following analyses:

	PARTS PER MILLION Nitrites	Nitrates
Boquet river above Willsboro	0.001	0.80
Boquet river below Willsboro	0.001	0.88

The samples were not large enough for determination of nitrogen as free and albuminoid ammonia, but the color of the water gives an approximate idea of the amount of organic matter present. These results are as follows:

	Turbidity.	Color.	Odor.	Alkalinity.	Total hardness.	Dissolved CO_2.
Boquet river:						
Above Willsboro mills	3	23	Distinctly vegetable	28	41.5	....
Below Willsboro mills	2	29	Distinctly vegetable.	29	37.7	0.3
Lake Champlain:						
Off Fairchild Point	1	10	Very faint vegetable.	......	......	....
Off Jones Point	1	8	Very faint vegetable.	44	50.0	....
Off Four Brothers Islands	1	10	Very faint vegetable.	42	45.5	....

It will be seen that the amount of organic matter as shown by the color was slightly greater below than above the mills, and

was nearly twice that of the lake water. At other seasons the color of the river is doubtless much higher than the figures given.

The soda process of manufacturing wood pulp yields as waste products practically all of the mineral constituents and the nitrogen of the wood; the black ash resulting from the burning of the soda liquor; the lime mud, or calcium carbonate, plus a certain amount of lost soda; the sludge and spent liquors from the bleachery; and wash water containing more or less wood pulp, etc. At rare intervals it may happen that a batch of pulp has to be wasted.

The mills of the New York & Pennsylvania Company at Willsboro on the Bouquet river use the soda process. Your letter of June 16th gives the amount of the waste products, as follows:

	Tons per annum
Lime sludge (calcium carbonate)	4,550
Bleach sludge	525
Black ash waste	2,625
Soda ash	175

Besides waste wood, chips, wash water from bleachery tanks, pulp rolls, etc.

On the day of my inspection the waste products were overflowing to a "detention basin," where the lime sludge and other solid matters were precipitated. There was a considerable flow of a dark colored alkaline waste liquor from this basin into the river. Below the dam of the retention basin there were found deposits of lime sludge, and the mud collected from the bed of the Boquet river near the mouth contained traces of calcium carbonate. The deposit which you sent me from Mr. Ellis's water tank was chiefly calcium carbonate in a finely divided state. From the various data and analyses it is quite evident to me that this lime sludge is not satisfactorily disposed of, but is at times allowed to enter the lake in considerable quantities. The complaint of Mr. Ellis that the lime sludge enters his water supply seems to be substantiated by my investigations; and this fact sheds some light on the distance to which the waste products from the mills may extend into the lake.

Although the waste products from the Willsboro mills are very large, I can see no season for believing that they contribute

materially to the growth of the algæ on the shores of the lake. The lime sludge and soda ash would tend to reduce the amount of free carbonic acid in the lake water. The various mineral salts of the wood naturally contain elements usable as food by the algæ, but the dilution of these substances by the water of the lake is so great that they do not exert a controlling influence on the algæ. Their influence may be considered as contributory, but I am unable to measure its value from the data at hand. The amount of wood pulp discharged from these mills is too small to be of significant effect in connection with the algæ growths. The thin films found on the stones of the lake shore between the Boquet river and Willsboro Point show no signs of wood pulp, but are due entirely to growths of microscopic organisms.

The mills at Au Sable Forks present a more serious condition. Here I am informed 100 cords of wood per day are treated by the sulphite process. This involves an enormous waste of the soluble portions of the wood, which you state amounts to between 75 and 90 tons a day. These substances are not altered by burning as they are in the soda process, and the sulphurous acid tends to prevent oxidation; hence they are discharged in a condition much more likely to undergo decomposition. Settling as they do upon the bottom of the river and lake they slowly decompose, and, if the deposits are sufficiently thick, or if they occur where the water is so deep that stagnation occurs, the decomposition takes place under anærobic conditions, resulting in the production of carbonic acid and other substances necessary to algal life. The sulphurous acid discharged also tends to lower the amount of dissolved oxygen in the water, thus favoring anæboric decomposition. During the winter when the river and lake are frozen over, the dissolved gases may accumulate, and stimulate the growth of organisms after the ice breaks up in the spring.

The sample which you collected from the ¾-inch service pipe in Keeseville, in December, 1903, was instructive. It was a leathery film composed largely of wood fibre, bound together by the organisms known as Leptothrix and Crenothrix, and containing a large amount of iron. Here was a definite case where the deposit of wood pulp had fostered the growth of these organisms to such an extent as to naturally affect the flow of

water in the pipe. There is little doubt in my mind that the partial anærobic conditions required by the organisms mentioned were favored by if not entirely due to the presence of the wood pulp deposits in the pipe.

On May 13th I collected samples of water from several places in Lake Champlain, the analyses of which are given on the accompanying sheet. The results are not different from analyses of many lake waters where algæ thrive on the shores even more vigorously than in Lake Champlain. There are few data available as to the occurrence of the free floating algæ, or Plankton, in Lake Champlain. In 1895 the water of the lake from Port Kent to the upper end was filled with a heavy growth of Dinobryon. On May 13th, the day of my recent visit, there was floating on the surface a thin film which looked like dust, or pollen, but which was a collection of Coelosphærium and Clathrocystis. It is apparent, therefore, that the lake water is of itself capable of sustaining growths of algæ.

As a general proposition, however, it is safe to say that the constantly increasing population on the lake, the greater amounts of sewage and trade wastes which it is receiving are factors which will tend to encourage the growth of algæ, and intensify the present unsightly conditions along the shores, unless they are controlled. Among these stimulating causes the discharges from the pulp mills, especially from those mills where the sulphite process is used, may be included; but the extent of their influence cannot be determined without a more extensive biological and chemical survey than I have had an opportunity to make.

Respectfully submitted,

G. C. WHIPPLE.

*Temperature Observations on the Water of Lake Champlain, June 19-20, 1895.

	STATION.				
	A	B	C	D	E
	DATE AND HOUR.				
	June 19, 10.30 a. m.	June 19, 12 m.	June 19, 5.20 p. m.	June 20, 11 a. m.	June 20, 3 p. m.
Depth, feet....... 0	67.2	69.5	67.4	66.1	67.2
..... 5	67.2	66.4	67.4	65.6	64.2
..... 10	62.0	65.0	60.2	64.9	63.0
..... 15	60.2	63.8	56.5	61.0	62.5
..... 20	57.5	60.7	54.0	58.9	61.3
..... 25	54.8	58.7	51.2	55.2	59.9
..... 30	54.2	54.5	49.8	52.2	58.0
..... 35	53.2	51.8	49.9	49.8	55.9
..... 40	51.9	51.0	48.9	48.2	53.9
..... 45	50.0	50.4	....	....	51.9
..... 50	47.9	49.7	46.6	46.5	51.3
..... 55	46.2	49.4	....	....	49.7
..... 60	45.6	49.2	45.5	45.1	46.4
..... 65	45.2	47.3	....	....	....
..... 70	44.7	46.3	44.4	44.3	45.7
..... 75	43.9	45.7	....	....	....
..... 80	43.2	45.0	43.7	43.6	45.0
..... 85	42.6	44.1	....	....	....
..... 90	42.2	43.8	43.0	42.7	44.2
..... 95	42.1	43.7	....	....	....
..... 100	41.9	43.4	42.3	42.2	43.0
..... 110	....	43.2	42.0	42.1	42.9
..... 114	41.7	....	....	....	....
..... 120	(Bottom)	42.8	41.9	42.0	42.4
..... 130	....	42.7	41.6	41.9	42.0
..... 140	....	42.4	41.4	41.6	41.7
..... 150	....	42.3	41.4	41.3	41.2
..... 160	....	42.2	41.4	41.3	41.0
..... 170	....	42.0	41.0	41.1	40.9
..... 180	....	41.9	40.9	41.0	40.8
..... 190	....	41.9	40.6	41.0	40.4
..... 200	....	41.8	40.4	40.9	40.3
..... 211	....	41.0	40.2	....	40.2
..... 220	....	(Bottom)	40.2	40.6	(Bottom)
..... 230	....	....	40.1	....	....
..... 240	....	....	40.1	40.2	....
..... 250	....	....	40.1	....	....
..... 260	....	....	40.1	40.1	....
..... 270	....	....	40.1	....	....
..... 280	....	....	40.0	39.8	....
..... 290	....	....	40.0	....	....
..... 300	....	....	40.0	39.8	....
..... 310	....	....	39.9	....	....
..... 320	....	....	39.7	....	....
..... 330	....	....	39.6	39.6	....
..... 340	....	....	39.4	(Bottom)	....
..... 350	....	....	39.4	....	....
..... 360	....	....	39.4	....	....
..... 370	....	....	39.4	....	....
			(Depth was 39.6' at this station.)		

Sta. A. Off Schuyler Island, on range Ferris reef to Schuyler reef.
Sta. B. Between Juniper Island and Schuyler reef, opposite Tree Point.
Sta. C. Between Cannno's Point and Sloop Island.
Sta. D. Between Schuyler Island and Juniper Island and between Apple Tree Point and the Four Brothers Islands.
Sta. E. Between Valcour Island and Colchester Point, opposite Carlton's Prize.

CERTIFICATE OF WATER ANALYSIS REPORTED TO PROF. OLIN H. LANDRETH.

SAMPLE.		PHYSICAL EXAMINATION.			CHEMICAL ANALYSIS (PARTS PER MILLION).										MICROSCOPICAL EXAMINATION. NUMBER OF STANDARD UNITS PER C.C.					
					NITROGEN AS												IMPORTANT GENERA.			
Date of collection.	Place of collection.	Turbidity. (Parts per million of silica.)	Color. (Parts per million of platinum.	Odor.	Albuminoid ammonia. Total.	Free ammonia.	Nitrites.	Nitrates.	Total solids.	Chlorine.	Total hardness.	Alkalinity (temporary hardness.)	Permanent hardness.	Free CO_2.	Total microscopic organisms.	Amorphous matter.	Conferva.	Clathrocystis.	Coelosphaerium.	Wood fibre.
May 13, 1903..	Bouquet river at:																			
	Willsboro.........................	3	23	32	....	....	.001	.80	....	....	41.5	28.0	3.5	1.7	....	....	....	....	....	....
	Mouth.........................	2	29	32	....	....	.001	.88	....	....	37.7	29.0	8.7	0.3	....	....	....	....	....	....
	Lake Champlain at:																			
	Fairchild's Point..................	1	10	12	....	....	....	....	....	....	....	....	....	1.8	40	40	....	15	20	5
	Jones' Point.........................	1	8	12	....	....	....	....	....	....	50.0	44.0	6.0	1.0	20	40	....	....	20	....
	Between Four Brothers and Willsboro Point.........................	1	10	12	.094	.002	.000	.40	56	1.0	45.5	42.0	3.5	1.7	60	20	15	10	15	20

*Observations made by G. C. Whipple, using thermophone. Weather on both days warm and calm.

METHODS OF ANALYSIS.

The methods of analysis used are those indorsed by the Committee on Standard Methods of Water Analysis of the American Public Health Association.

To express results in "Parts per 100,000," divide the figures given by 10.

To express results in "Grains per U. S. gallon," divide the figures given by 17.1.

The "coefficient of fineness" of the suspended matter may be obtained by dividing the suspended solids by the turbidity.

To express the color in terms of Hazen's Original Platinum Standard, divide the figures given by 100.

The following abbreviations are used to describe the odor:

INTENSITY.	QUALITY.	
0. None.	v. Vegetable.	e. Earthy.
1. Very faint.	m. Moldy.	d. Disagreeable.
2. Faint.	a. Aromatic.	
3. Distinct.	f. Fishy.	
4. Decided.	g. Grassy.	

In the test for B. coli, O denotes the absence of the organism; + denotes its probable presence as determined by presumptive tests; ± denotes its certain presence as determined by complete analysis by sub-cultures.

One standard unit of microscopic organisms and amorphous matter is equivalent to a superficial area of 400 square microns as observed under the miscroscope.

G. C. WHIPPLE.

SOFT COAL SMOKE NUISANCE AT MECHANICVILLE.

ALBANY, N. Y., *June* 29, 1904.

Hon. BENJAMIN B. ODELL, JR., *Governor of the State of New York, Albany, N. Y.:*

Dear Sir:—On the 20th of May I had the honor to receive a complaint from your secretary concerning a soft coal smoke nuisance at Mechanicville, with the request that the State Department of Health take some action thereon.

The smoke nuisance at Mechanicville is an old question in this office. While the recent complaint is concerning a single mill, The Sagamore Knitting Company, the same objection obtains against a score of other manufacturing establishments, and the very existence of the manufacturing enterprises of Mechanicville is involved in the question, as they all use soft coal, and any action taken against one should be instituted against all the others.

Something over a year ago a complaint similar to this one was investigated by the Department, and the owners of the Union Mills promised to the local board of health of Mechanicville, which is the body having jurisdiction in the matter, that they would equip said mills with a smoke consumer if one could be found. There is no reason to doubt that the mill owners have been making honest efforts to find some device which will modify or entirely abate the nuisance complained of. Enclosed you will please find a copy of a letter of recent date from the proprietors.

It does not appear to be within the province of the State Department to suggest a *specific* method of abating an alleged nuisance, or if it were, we should not know what to suggest to these people except to advise the local board to prohibit the use of soft coal in all the establishments located in the village. Such a change in their methods, I am informed, might result in the closing of some of the mills, which would incur a heavy loss to all the business enterprises of the village. We seem restricted in our consideration of the case to the suggestion that the consumers of soft coal be urged to continue their efforts to find

some device which would be satisfactory in its operation. Until such time I am not quite ready to order the village board to prohibit the use of soft coal absolutely. The local board will be urged to use every possible means to reduce the effects of the use of soft coal to the minimum, thus giving the inhabitants of the village all the protection which they can.

Very truly yours,

DANIEL LEWIS,

Commissioner of Health.

SPECIAL INVESTIGATIONS.

WATERTOWN.

EPIDEMIC OF TYPHOID FEVER.

WATERTOWN, N. Y., *January* 30, 1904.

State Commissioner of Health, Albany, N. Y.:

Dear Dr. Lewis:—We are having an overplus of typhoid fever in town. Over 125 cases reported so far this month. Now I have advised through the papers officially that all water for drinking purposes be boiled. There seems to be no tendency to localization. The reports come from all sections of the city. There have been several cases in Carthage, 18 miles above our water intake. Do you advise anything further? If so wire me.

Very sincerely,

E. S. WILLARD.

ALBANY, N. Y., *February* 8, 1904.

Prof. OLIN H. LANDRETH, *Consulting Engineer, State Department of Health, Schenectady, N. Y.:*

Dear Sir:—This Department is in receipt of the monthly report of Dr. E. S. Willard, Health Officer of Watertown, N. Y., in which he reports one hundred and eighty cases of typhoid fever in that city for the month of January.

In view of the fact that numerous cases have been reported from Watertown each month for the past few years, I deem it advisable to again investigate as to the purity of the public water supply, and advise that you proceed to Watertown for that purpose, with the suggestion that you procure and forward specimens of the water for chemical and bacteriological examinations.

In submitting your report to me, kindly make such recommendations as in your judgment are necessary in the matter of securing a pure supply of water for the city of Watertown.

When you reach Watertown call upon the health officer, also upon the board of water commissioners who will no doubt give you all the information that you may need as to the present situation.

Very respectfully,

DANIEL LEWIS,

Commissioner of Health.

SCHENECTADY, N. Y., *February* 15, 1904.

Dr. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—I beg to submit the following preliminary report on the typhoid conditions thus far found to exist in the city of Watertown, which you directed me to investigate.

I reached Watertown on the morning of the 13th inst. and at once had an interview with Dr. E. S. Willard, health officer, and later with Mr. John B. Rogers, president of the city board of health, and with Mayor Bingham. At the time of my arrival 280 cases of typhoid had been reported to the health officer since January 1st; 180 cases during January, and thus far 100 during February. As the physicians are all working under great pressure and as it is known that for this and other reasons reports are not all being promptly filed it is more than probable that the actual number of cases which have occurred since January 1st has now reached or possibly exceeds 300. If the rate which the cases are being reported is taken as an index of the rate of occurrence, the climax of the epidemic has not yet been reached.

About 60 of the cases reported have been investigated by Health Officer Willard, assisted by Mr. W. E. Fuller, assistant engineer on the filtration works now under construction. A study of the records of these 60 cases show that all but two or three had used city water either wholly or partially prior to attack and that only two or three cases were reported as not having used the city water. Geographically the cases are distributed with fair uniformity and the absence of any decided concentration thus far renders the existence of any local cause quite improbable. Similarly the theory that milk may be a vehicle of transmission has slight support since the cases reported are on the routes of a large number of milk pedlers although the sources where these pedlers secure their supply are not stated in the statistics furnished me. This information and that along other lines I am now having gathered for me, not only for the 60 cases thus far reported but for all the cases.

The sudden increase in the number of cases of typhoid in Watertown from 14 in October, 7 in November, 15 in December to 180 in January and 100 thus far in February, points to a very marked and sudden increase in the infecting causes; and the fact that

nearly all of the cases reported used city water and that but two or three did not use city water points to the city water supply as the apparently most probable cause and the one which should receive first investigation. Later results of this investigation may perhaps not verify this hypothesis. The public water supply however is the only one of the probable avenues of infection on which thus far I have discovered any sudden change of condition which could account for the observed sudden increase in typhoid, and even here the suspected sudden change is not yet fully verified. It has been reported to me that a thaw followed by a decided rise in the Black river occurred about or soon after Christmas time. An examination of the State Weather Bureau report for the month of December shows that at both Watertown and Lowville maximum daily temperatures varying from 33 to 42 degrees Fahrenheit were attained between December 20th and 24th inclusive. The weather report also shows that upwards of one inch of rain fell at each of these stations between these dates, and it is fair to suppose that a considerable rise in the river would follow this thaw and rain, though this supposition is being verified. It is known that at least 15 cases of typhoid fever have occurred closely adjacent to the Black river or its tributaries within 35 miles of Watertown during the last three months of 1903, and it is more than likely that the inquiry now being made will reveal other cases. This combination of circumstances of a continued thaw extending over five days following a continued freezing temperature and consequent detention and accumulation of polluting material on the watershed, together with the known existence of typhoid on the watershed within a few hours river flow above Watertown appears to furnish a promising line of investigation, particularly as none of the other possible lines of transmission have thus far furnished any clew for investigation.

After receiving all the information available at Watertown I furnished Dr. Willard a written statement, dated February 13th, a copy of which I herewith enclose. I also secured the appointment of five special inspectors, four of whom are to secure complete data and information of every case of typhoid reported on properly prepared schedule blanks, from which I expect to derive valuable information as to the validity of the present hypothesis

that the cause of the epidemic is to be assigned to the city water supply. The fifth inspector, Mr. W. E. Fuller, assistant engineer on the construction of the new filters, has been assigned to the work (1) of securing further meteorological river data; (2) the ascertaining more precisely the number and location of typhoid fever cases on the watershed of the river above Watertown; (3) the tracing of the several sources of milk supply of the different pedlers on whose routes typhoid fever now exists; (4) the sampling of specimens of water from the public supply and from certain wells for chemical and bacteriological examination; and several other minor lines of inquiry. I also advised the health officer to have printed a large number of notices urging the people to use no city water for potable purposes without first thoroughly boiling it, and advising that such notices be distributed by the city police to every family in the city and also that such notices be conspicuously posted in public places, schools and factories.

It is my intention to return to Watertown in a few days for the purpose of further studying the statistics and information now being gathered. Further developments will be reported to you promptly.

The city has in the past had more than its share of typhoid. The records in your office show the following deaths from typhoid during the preceding six years.

Year.	Deaths from typhoid fever.	Year.	Deaths from typhoid fever.
1898	19	1901	8
1899	18	1902	15
1900	22	1903	17

The cases and deaths during each month of 1903 were as follows:

1903.	Typhoid cases.	Deaths from typhoid.
January	23	0
February	42	2
March	29	5
April	18	0
May	3	3
June	9	2
July	23	1

1903.	Typhoid cases.	Deaths from typhoid.
August	22	2
September	21	0
October	14	0
November	7	1
December	15	1
	226	17

The city water supply is, as you know, drawn at present in an unfiltered state from the Black river, whose watershed contains several large villages and a large number of smaller villages and hamlets. The Board of Water Commissioners have for several years past been considering the question of a new source of water supply or the installation of filtration works to improve the present one. Recently a contract has been let for the construction of a rapid sand filtration plant and work on this has but recently been commenced. I have not ascertained how soon this plant will be in operation, but I infer it will be several months at least, so that the only protection the people have against the present and similar repetitions of this catastrophe will be either in the avoidance of the public water altogether or its use after boiling or individual filtration.

On January 30, 1896, the Board of Water Commissioners of the city of Watertown petitioned the State Board of Health to enact a set of rules and regulations for the sanitary protection of the waters of Black river above the pumping station. These rules were accordingly prepared, enacted at a meeting of the State Board of Health on February 28, 1896, duly published in the requisite newspapers and thereby came into legal force. The initiative in the enforcement of these rules is, as is well understood, in the hands of the city officials having the water department in charge. So far as I was able to ascertain during my stay at Watertown no active measures have ever been taken to enforce these rules or to remove well known sources of pollution. I shall look more fully into this phase of the matter on my next visit to Watertown. I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

WATERTOWN, N. Y., *February* 13, 1904.

DR. E. S. WILLARD, *Health Officer, Watertown, N. Y.:*

Dear Sir:—It is, of course, too early to make any final report of my investigation into the cause of the recent outbreak of typhoid fever in this city, but there are a few points of importance to which attention should be drawn even at this early date.

It will, of course, require several days to ascertain with certainty the specific cause of the prevailing typhoid, but it is proper to indicate what cause the present evidence seems to point to, and also to outline my intended examination.

On the first of these points the evidence now available, which you have so judicially gathered, aided by the coöperation of Mr. W. E. Fuller, points rather strongly to the public water supply as the direct cause of the present epidemic. Further investigation, however, may not substantiate this hypothesis, but the evidence is strong enough to warrant taking most stringent precautionary measures during the further prosecution of this inquiry. While these precautions are being taken it is my intention to prosecute through your office careful study of the evidence which the present and past cases offer. I am also arranging for the gathering of information concerning the probable existence of an infecting cause of the public water supply as observed from the side of the river itself. This will include a study of the existing pollution on the watershed above Watertown, the source of possible pollution, and the climatic conditions which may have contributed to a sudden increase in its pollution. In order to render this evidence available without delay, it is essential that a number of special inspectors be appointed and instructed in their duties, and when gathered, the evidence secured by these inspectors will be properly collated and studied. In another direction also it is highly essential that each physician practicing in the city should report promptly to you all unreported cases which have occurred in their practice up to and including today. After this an inspector will daily call on each physician to secure records of additional cases. It is also desirable that individuals on whom the inspectors shall call for information relative to the several cases of typhoid already reported, shall render all desired information in as full and prompt a manner as possible.

In order to prosecute the above mentioned inquiries and also in order that the people may protect themselves effectually against

what now appears to be the cause of the prevailing typhoid, I beg to submit the following recommendations:

(1) I beg to recommend that five inspectors be appointed and assigned for duty, beginning Monday morning. If this should be adopted, I will indicate the data and information which I should like to have them procure.

(2) I also beg to recommend that the attention of practicing physicians be called to the importance of promptly reporting to you directly hitherto unreported cases up to and including today; and that hereafter during the prosecution of this inquiry each physician shall daily report to the inspector calling upon him each case of well defined typhoid occurring in his practice.

(3) I also beg most emphatically to urge that the public be strongly advised by you that all city water used for potable purposes, as well as for any purpose by which it may come into intimate personal use, shall, before being used, be boiled at least 20 minutes. Experience has proven that this simple precaution, if thoroughly carried out, is an effectual preventive of typhoid infection.

(4) I also beg to recommend that the attention of practicing physicians, nurses, and other persons in charge of typhoid patients be called to the importance of employing the most thorough methods of disinfecting all excretal matter, and that, if you deem it necessary, a special circular of instructions shall be prepared and issued by you for the information of the public on this point.

It is my intention to get this inquiry well under way and then to return to Watertown by the time the evidence is gathered and then to take such further steps as may seem necessary. I am, dear sir, Very truly yours,

OLIN H. LANDRETH,
Consulting Engineer,
State Department of Health.

ALBANY, N. Y., *February* 23, 1904.

DANIEL LEWIS, M. D., *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—Following is the report on the specimens of water received from Prof. Landreth at Watertown, N. Y. All specimens received here February 17th; analyses started February 17th.

Specimen No. 1.—" Black river water taken from hole in ice at intake of Watertown Water Works, February 15, 1904. Temperature when taken, +32° F." Agar plates showed 280 organisms per c. c. Gelatin plates showed 14,200 organisms per c. c. These plates were partially liquified with a moderate putrefactive odor. There was gas in all of the fermentation tubes, in three of which it was of the type characterized by the colon bacillus. This water is therefore condemned.

Specimen No. 2.—" Taken from Knowlton Bros.' well, February 15, 1904. Temperature, +50° F." Agar plates showed 18,000 organisms per c. c. Gelatin plates showed 35,000 organisms per c. c. These plates were partially liquified with an ammoniacal and putrefactive odor. There was gas formation in all of the fermentation tubes, in three of which it was of the colon type. This water is therefore condemned.

Specimen No. 3.—"Well at Remington Block, Hamilton near Bronson St., February 15, 1904. Temperature, +37° F." Agar plates showed 1,260 organisms per c. c. Gelatin plates showed 15,000 organisms per c. c. These plates were partially liquified with a strong putrefactive odor, proteus colonies present. There was no gas in any tube.

Specimen No. 4.—" From 20 Hawk St." Agar plates showed 240 organisms per c. c. Gelatin plates showed 20,000 organisms per c. c. These plates were partially liquified with a strong putrefactive and ammoniacal odor; proteus colonies. There was gas in three fermentation tubes, in none of which was it of the colon type.

Specimens No. 3 and No. 4 are not condemned but it is advised that they should be boiled before use as drinking water.

Dr. Tucker has been notified as requested.

Respectfully submitted,

R. M. PEARCE,

Director.

ALBANY, N. Y., *February* 23, 1904.

Dr. DANIEL LEWIS, *Commissioner, New York State Department of Health, Albany, N. Y.:*

Dear Sir:—I respectfully enclose herewith reports in duplicate on the analyses of four samples of water received by your order

on the 16th instant from Watertown, and sent by Professor Olin H. Landreth, C. E.

Samples Nos. 749 and 752 resemble each other quite closely. While they are not entirely satisfactory the analytical results, in themselves, do not justify their condemnation. I am not informed as to the present condition of the river, nor concerning the location and surroundings of the intake, but it is probable that, from a chemical standpoint, the water is at its best, or near it, at this season. The fact, however, should not be lost sight of that waters may become specifically polluted and capable of conveying the germs of diseases like typhoid fever, although their chemical character may not be materially altered, and that this is especially true in the case of surface waters where the proportion of sewage added to the stream, or other body of water, is comparatively small.

Samples Nos. 750 and 751, both from wells, present decided differences. Aside from the chlorine, which is high, No. 750 is of satisfactory quality. In No. 751 the chlorine, nitrates and total solids are all high and this water cannot be recommended for domestic use.

I am informed by the Director of the Bureau of Pathology and Bacteriology that his examination of these waters indicates objectionable pollution in the intake and Knowlton samples, and, taking all the facts into consideration, and under the conditions now existing at Watertown, it would, in my judgment, be advisable to recommend that so much of the city water as, in each household, is used for drinking, be thoroughly boiled during the continuance of the present epidemic at least.

Very respectfully yours,

WILLIS G. TUCKER,

Director.

Albany, N. Y., *March* 2, 1904.

Daniel Lewis, M. D., *Commissioner, State Department of Health, Albany, N. Y.:*

Dear Sir:—Following is the report on the specimens of water received from Prof. Landreth from Watertown, N. Y. Specimens received February 26th; analyses following day.

Specimen No. 5.—"Taken at 25 Coffeen St. on February 22nd." There was no gas in four fermentation tubes; in the fifth there was gas formation but not of the colon type. Agar plates showed 190 organisms per c. c. Gelatin plates were partially liquified with a moderate putrefactive odor.

Specimen No. 6.—"Taken from well at Deferiet St. on February 22nd." There was no gas in any of the fermentation tubes. Agar plates showed 50 organisms per c. c. Gelatin plates were partially liquified and showed 30,000 organisms per c. c.

Specimen No. 7.—"Taken from cistern on Seray St., Hunting Farm, on February 23d." There was gas in only one tube in which it was not of the colon type. Agar plates and gelatin plates both showed 250 organisms per c. c. with a slight odor.

Specimen No. 8.—"Taken from well Pearl, corner Moulton Sts. on February 23d." There was no gas in any of the fermentation tubes, in fact there was little if any growths. Agar plates showed 250 organisms per c. c. Gelatin plates showed 14,000 organisms per c. c. with a moderate odor.

None of these waters showed any organic contamination and all are passed with the exception of No. 6, which is condemned on the basis of the high bacterial count.

Respectfully submitted,

R. M. PEARCE,

Director.

SCHENECTADY, N. Y., *March* 8, 1904.

DR. DANIEL LEWIS, *State Commissioner of Health, Albany, N. Y.:*

Dear Sir:—Without waiting for the submission of my final report on the Watertown typhoid fever epidemic it appears proper that I submit this partial report on the present situation at Watertown; more especially with reference to the steps which have been taken toward the disinfection of typhoid infected points on the watershed.

My second visit to Watertown covered February 20th, 21st and 22nd. On reaching there on the 20th I found awaiting me information concerning some cases of typhoid on the watershed and immediately sent Mr. W. E. Fuller with two assistants to verify the information and to thoroughly disinfect and maintain disinfec-

tion at the points discovered, and also to search for further cases. I gave Mr. Fuller an official badge as inspector and telephoned you requesting that you commission him a State inspector, which you promptly did. Mr. Fuller, on February 20th, commenced his inspection, verified the location of several cases and placed two men in charge of the cases discovered and continued his search until February 26th, inclusive, up to which time he had located 36 cases of typhoid since September 1, 1903. These cases were situated as follows:

Five cases in the village of Black River, 4½ miles above the Watertown intake; 15 cases in the village of Deferriets, 12 miles above the Watertown intake; 16 cases at Carthage and West Carthage, 18 miles above the Watertown intake.

No cases were found at Great Bend or Felts Mills; both situated between Black River and Carthage. Mr. Fuller placed Mr. W. S. Burt in charge of the cases at Deferriets and Mr. B. M. Allair in charge of the cases at Carthage and West Carthage, and provided them with disinfectants and instructed them in the methods of disinfection. I also secured an order from the general manager of the St. Regis Paper Company, which corporation owns all of the houses in the village of Deferriets, prohibiting all persons from placing typhoid discharges in any sewer or water closet in the village.

On February 26th, Mr. Fuller suspended his search for new cases and wrote me asking to be relieved of his work, stating that he was not well and also that his duties in connection with the filtration plant at Watertown would prevent his prosecution of the inspection of the watershed above Carthage. Immediately on receipt of this letter of February 28th, I telephoned you for authority to have appointed a successor to Mr. Fuller, which authority you gave, and I then immediately telephoned Dr. Willard, health officer at Watertown, requesting him to appoint a man and set him at work and telegraph his name to Albany, in order that he might receive a commission as State inspector. Hearing nothing from Dr. Willard, I telegraphed him on March 1st as follows: "Please hurry appointment of inspector to succeed Mr. Fuller. Have heard nothing." No answer was received to this telegram and on March 2d I verbally recommended to you that you take up the matter with Dr. Willard directly, and as a

consequence of the communication with Watertown you directed me on March 3d to proceed to Watertown for the purpose of arranging for the resuming and prosecution of the search for further cases of typhoid on the watershed and for the purpose of adopting such measures as might be found advisable for the protection of the water supply of the city of Watertown. Acting under these instructions I left for Watertown on the night of March 3d, arriving there next noon and found that no steps had been taken by the city of Watertown toward the resumption of Mr. Fuller's work, although the two men in charge of cases already located had been allowed to remain.

In an interview with Mr. John Rogers, president of the city Board of Health, and Dr. George A. Soper, sanitary expert adviser to the Board of Health, it developed that since my previous visit the Board of Health, as indicated by its president at least, had changed its former attitude on the matter of prompt disinfection of infected points on the watershed, and presented successively various objections to further prosecution of the work; not, however, until pointed intimations had been made by the president and Dr. Soper that the entire management of the watershed matter be left to the city Board of Health. Being convinced that under such an arrangement no effective measures would be carried out toward this important part of the city's protection, and failing to secure assurances that such work would be promptly and vigorously prosecuted I declined to accede to such suggestion and in turn strongly urged coöperation between the city and the State in this work, emphasizing its importance as the only means of diminishing the danger of further infection of the city's water supply as soon as rains or thaws should occur. At this and later interviews, at some of which Dr. Willard was present, I presented the necessity of State authority in any measures undertaken outside the limits of the city of Watertown and also the desirability that the city should actively coöperate in such work. This coöperation was distinctly declined and the suggestion was then made by the president of the city board that the State Department assume the entire charge and expense of the work on the watershed. Feeling that this plan was neither appropriate nor just I addressed a written communication to Dr. Willard on March 5th, of which I inclose a copy marked (A), proposing that the

State Department of Health should assume the charge and the expense of the work of searching for infected points on the watershed, and that the city should assume the management and expense of disinfecting and caring for such points when discovered. After waiting more than half a day without receiving a reply I decided to arrange without further delay for resumption of the watershed inspection and for that purpose appointed two inspectors, Mr. Peter A. Ward and Mr. B. M. Allair, both of Watertown, as State inspectors, furnishing them with commissions and badges, and directed them to proceed at once to a vigorous canvass of the watershed for further cases of typhoid fever, and directed them that when such cases were discovered prompt notification of such cases and their location should be sent to the Watertown Board of Health in order that the Board might take such action toward the disinfection of such points as it might choose. I inclose you a copy marked (B) of the letter of instructions to Mr. Ward, which instructions, however, were subsequently withdrawn and replaced by others.

Late in the afternoon of the 5th inst., while arranging for the inspector's work on the watershed, I received from Dr. Willard an answer to my communication of that morning, a copy of which communication marked (C) I inclose. This letter, while accepting the proffered assistance of the State Department of Health as proposed, stated that in the judgment of the local Board of Health it was necessary that the management of the entire work on the watershed outside the limits of Watertown should be in the hands of the State Department of Health and proposed to provide such funds for this work as the necessities of the work within the city would permit.

On receipt of this communication I communicated with you by telephone and received your authority to accept the modified plan as submitted by Dr. Willard, if in my judgment the local circumstances warranted it. While I felt that under the plan which I had already instituted the city Board of Health would not have felt at liberty to disregard notification of the location of typhoid cases on the watershed, I was not satisfied that measures of disinfection instituted under such conditions would in all cases be prompt and thorough, and I therefore concluded to accept the final proposition of the city leaving the adjusting of the details

of the financial arrangement therein proposed to you for subsequent consideration. I accordingly withdrew the instructions which I had already given the two State inspectors, and issued other instructions to them, providing for not only the canvass for typhoid cases but also the execution of the work of disinfection of such effected points. I inclose herewith a copy marked (D) of my revised instructions to the inspectors.

As the adjustment of the matter with the city was not completed until late Saturday night, March 5th, and as no trains left Watertown during Sunday until 6:30 p. m., I directed Mr. Ward on Sunday to secure a list of ten assistant inspectors who should remain in Watertown without pay, subject to the call of Mr. Ward or Mr. Allair, and who, when notified, should promptly report at any needed point on the watershed. Two of these men I instructed to accompany Mr. Ward and Mr. Allair in order to be on hand to take charge of the first cases which might be discovered. One of these men was assigned by Mr. Allair at once to duty at Carthage and West Carthage in the work of local supervision of the cases from which I had taken Mr. Allair himself. These four men were instructed to leave Watertown by the first train Monday morning for up-river points, and Mr. Allair to stop and inspect the work of Mr. Burt at Deferriets and also to investigate one or two rumors concerning recent cases in the territory originally canvassed by Mr. Fuller, while Mr. Ward and his assistant inspector, Mr. Carrol, proceeded to Lowville. I have today received two communications from Mr. Ward from Lowville, dated March 7th, in which he reports having been informed by the attending physician, Dr. Hubbard, of two cases of typhoid fever in Watson, seven miles distant, both of which terminated fatally in October. He also mentions information concerning two cases at Naumburg, near Castorland, about 30 miles above Watertown, which he intends next to investigate.

After the suspension of the canvass for typhoid cases and the loss of nine days valuable time the work of this canvass was again taken up yesterday morning with five men in the field and eight others ready for duty as soon as needed. With rain yesterday and thawing conditions on the watershed it is evident that the beneficial results of this work now resumed will be far less effective and extensive than they would have been 10 days ago.

During my stay at Watertown I was careful that the public should receive no intimation of the fact that the city officials were not working in utmost harmony with the State Department of Health, as I considered that such public knowledge could serve no useful purpose and would probably result in loss of confidence and hence also of efficiency of public measures.

The two State inspectors are to be paid $5 per day and their necessary expenses actually incurred, and the assistant inspectors are to be paid $3 per day and their necessary expenses. In addition to the services and traveling expenses there will be some expenses for disinfecting materials and also some expenses for labor where disinfection necessitates special work.

I am, dear sir,

Very truly yours,

OLIN H. LANDRETH,

Consulting Engineer.

P. S.—It is proper to state that in the discussion of this entire matter with the Watertown authorities, Dr. E. S. Willard, City Health Officer, has uniformly taken the position that the protection of the watershed was a matter of urgent necessity and should be prosecuted with vigor.

OLIN H. LANDRETH,

Consulting Engineer.

Investigations were also made as follows:

Bergen—Alleged nuisance caused by unsanitary condition of slaughter house.

Hoosick Falls—Alleged pollution of the Hoosick river by reason of the discharge therein of refuse from the Walloomsac and North Hoosick paper mills.

Newburgh—Alleged violation of provisions of chapter 468, Laws of 1903, by the Highland Brewery Company discharging refuse into stream.

New Lebanon—Alleged pollution of stream by sewage from Columbia Hall.

Ossining—Alleged existence of unsanitary conditions caused by the discharge of sewage upon the land of the Allcock Manufacturing Company.

Penn Yan—Alleged unsanitary condition in village caused by obstruction to the flow of Jacobs brook and discharge of sewage into same.

Prattsville—Alleged nuisance caused by creamery and sugar factory discharging refuse into stream.

Suffern—Alleged unsanitary condition caused by overflow of water from Lake Antrim.

Syracuse—As to purity of ice harvested on Onondaga Lake and Erie Canal, used for domestic purposes.

Watkins—Alleged nuisance caused by obstructions to the natural and proper overflow of the waters of Seneca Lake through the outlet of same.

West Seneca—As to the alleged unsanitary site of a contemplated public school building.

Yonkers—Alleged nuisance caused by dumping garbage at Yonkers Park.

Proceedings of the Conference

OF THE

Sanitary Officers of the State.

Fourth Annual Conference of Sanitary Officers of the State of New York, Held in the Assembly Chamber, Capitol, at Albany, N. Y., December 15 and 16, 1904.

AFTERNOON SESSION, THURSDAY, DECEMBER 15.

The convention was called to order by Dr. Daniel Lewis, State Commissioner of Health, who spoke as follows:

Dr. Lewis:

I must announce to you, gentlemen, at the outset, that I am the self-appointed conductor of this conference, which reminds me to suggest that if all sanitary officers were self-appointed, it would result in a greater amount of unanimity than is usual. However, being thus appointed, it affords me great pleasure to welcome you to this Fourth Annual Conference of Sanitary Officers. It is a pleasure to note that so many of the sanitary officers of the State are willing to leave their business and come here, as you have done, to study problems which concern the public health of the people of the State.

When this system of conferences was first established it was believed that it would result in larger views of sanitary questions; that the health officer of a municipality would not be concerned solely in answering a little complaint of an alleged nuisance in his neighborhood, but that he would see and appreciate the necessity of more comprehensive work than is employed, or used to be employed, in the duties prescribed and carried out by the health official; that this has been the result thus far is very evident in the work of the State Department of Health. Whereas a few years ago it was a common thing for a month to open with several hundred delinquents on the list, as far as sending in their reports, certificates, etc., was concerned, it has proven to be the fact that for the last year or more there is very seldom two dozen men whose certificates are not on file in the Department at the close of the month.

That is only one of the results which we have noticed. We have noticed that communities over which you preside are more alive to their requirements from a sanitary point of view; that they are more particular about the protection of their water supplies, more anxious that proper systems of drainage should be installed, and numerous things have come up to convince us that no mistake was made when these conferences were established.

There is not much for the conductor of this meeting to say, for the simple reason that we have furnished you with a program for discussion which will occupy all the time at our disposal.

Those of you who have attended these meetings heretofore will recall the fact that they have been indeed conferences. The person whose name appears on the program opens the discussion. It is for you to carry that forward, to exchange ideas and to get all possible information and benefit from the discussion which you can, and that will be the rule to be followed at this meeting. We shall necessarily limit discussions to perhaps ten minutes, unless you are willing to stay here all night, as the members of previous conferences have certainly been willing to do, but if the discussions can be limited, if you can say what you have to say within that time, it would be a better and more valuable discussion, because we could hear from more gentlemen who are present.

The work of the State Department during the year has comprised one or two new features. In the first place you will recall that we now require reports of cases of typhoid fever. The reason for that must be obvious to every one of you. Typhoid fever is one of the preventible diseases. No disease that we have to deal with is more entitled to be classed as preventible than typhoid fever, and the work of the Department is facilitated greatly in tracing the cause of epidemics by having these reports made. If they have not been made by all of you, we trust that one result of this meeting will be that you will hereafter carefully report all cases of typhoid fever.

We found last year that in the appointment of health officer there were some changes necessary. We supposed that a local board of health would always make nominations of just the

proper man for health officer under their jurisdiction. We found later on that occasionally the local board would make no nomination at all, for reasons which I never have questioned,—perhaps they were valid reasons; but there was danger of the law as it stood being annulled, if any one chose to do it, and we were anxious that every man should receive his appointment from here, so that he would be invested with a tenure of office which would make him a useful man, more useful year by year, and that the best possible man should be secured. So the law was amended to make it read that if the board of health fails to make a nomination within thirty days after the expiration of the term of the health officer, an appointment may be made independent of that nomination of the local board.

Right here let me say that there are about one hundred men still acting as health officers who are not legally appointed. If any of you happen to be in that category, as you may in this way,—you may have been appointed health officer of your village; you may have received an appointment for the town in which the village is located. It is necessary for you to receive an appointment from each one. So that those of you who are health officers of a village and of a town should file two nominations, in order to make your acts as health officer strictly legal.

I mention these things in order that it shall be clear in your mind what is now necessary,—that the time has expired when any man can be a legal health officer under the old system of receiving an appointment from the local board.

I have been requested to mention several items connected with health officer's work. I will mention some of them now,—I expect to speak once more before this meeting closes, and then I can supplement anything that I may omit.

I find here a memorandum concerning burial permits. We believe (perhaps we are mistaken) that there are places in the State where burial permits are not always secured before interment. It is possible, as you can at once see, that in such cases the mortality statistics of the State may be defective in that people will die and be buried without ever consulting the authorities at all. Now that would not be a possible thing in New York city or in the larger towns. It should not be possible anywhere and we propose to issue directions that no interment shall be

made without a burial permit having been issued by the proper officer upon the presentation of a death certificate.

In this connection, one other defect should be remedied, viz., there has been no provision made heretofore for the reports of still births, which should be reported if the vital statistics of the State are to be absolutely correct. We shall have certificates for those cases prepared for your use in the near future.

I have also been asked to call your attention to the fact that a large number of health officers are supplied with test tubes, culture tubes that are doubtless worthless from having been kept so long in your office. If any of you have such culture tubes in your possession, you are requested to return them here for a fresh supply.

One thing has always been a source of regret to me since I have been connected with the Health Department, and that was the lack of cooperation which we needed with the Department of Public Education. As we all know the school is a prolific source of distribution of contagious diseases. That has always been so and always will be, and it was essential, as it seemed to me, to have the most cordial cooperation between this Department and the Department of Education. I have talked the matter over with various gentlemen connected with that Department and I have invited Dr. Draper to come to this meeting, to lend us his presence and to say a few words, and if he is not willing to say it all, he can introduce Mr. Wood, who has prepared a paper on the subject of "The Hygiene of School Houses." Dr. Draper, Commissioner of Education.

Dr. Draper:

MR. COMMISSIONER, LADIES AND GENTLEMEN: I was very glad indeed to accept the invitation of the State Commissioner of Health to come in to this meeting, for more reasons than one. In the first place I was glad to show the interest of the State Department of Education in the concerns that brought this gathering here, and perhaps more than that, I was glad to get for myself something of the advantage that ought to flow from the deliberations of such a gathering.

As has already been observed by the State Commissioner of Health, the relation between the work of the schools and the

work of keeping clean and decent is inevitably a very close relation and we ought to be upon the most cordial standing. I suppose that that is ordinarily the case. I have no doubt that we have begun to realize on each side long before this that the work that we have in hand is not perfunctory and that it can not be accomplished by mere good nature or by any ordinary polite attention to it. It is serious business upon each side, calling for a clear outlook, for a perfect understanding and for aggressive methods.

As has well been said, the free public school becomes almost inevitably the rather natural clearing house for disease in a community, and that puts it upon us to be more than careful about the sanitation of the schoolhouse and the condition of the pupils; and if there is a teacher in the State (I don't know that there is one), but if there should be a teacher in the State who did not heartily welcome the attendance and the rational and sane aid of a health officer, the teacher would be out of joint surely with the State educational system. There is nothing of more consequence to the upbuilding of popular education in the State than that the schoolhouses shall be wholesome, clean, adequate in air space and in floor space, amply ventilated and reasonably heated. In these days of innumerable mechanical devices, I suspect the children in the schools are oftener robbed of the real advantages of God's fresh air than they ought to be by reason of any mechanical arrangement. I have less sympathy with the heating and ventilating devices, speaking generally, in the schoolhouses than I have in the fact that the best aid to health is sunlight and fresh air.

Of course there is about every schoolhouse a very natural accumulation which children bring in of filth and dirt. It is the business of the health officer to help get rid of the filth and dirt and help keep things clean. They ought not only to be welcome in the doing of this, but they ought to be cordially and heartily sustained in the business of doing it, and it is the purpose of the Education Department to rely not a little upon health officers, and when we rely upon health officers, we are bound to be good natured to them and to help them along and support them in what they do. We sometimes think that our fathers were a good deal more fortunate than we are perhaps, in that they did not

know so much about microbes as we do. We know so much about these things that sometimes we know about some things that may not be so. It is rather important to know all that is so, and it is quite as important to be on our guard about not knowing what is not so. I suspect that medical science is going to fathom the truth of that great problem and that it is getting upon pretty secure ground. I will not lose sight of the fact, Mr. Chairman, that you admonished me before I started that the program was full and that the time was fully occupied by men who are on the regular list.

Dr. Lewis—That does not apply to you, Doctor.

Dr. Draper—I shall not lose sight of the fact either, that you only invited me to come up here in order to be instructed and educated, and that it was not at all contemplated that I should have anything to say. Indeed, I have arranged that the message from the Department of Education, the real message, shall be delivered by the Chief of the Division of Inspections, Mr. Frank H. Wood, and I have really come up here to tell you that Wood is all right. You need have no misgivings upon that point. Our Inspections Division, under his management, is looking after the school affairs of the State I think more carefully and with more pains and perhaps more comprehensively than it has been done before, because I think that the Division is more closely and sharply organized for work. The Division is very intensely interested in all that concerns the schools or concerns the schoolhouse and the condition of the children, as conditions precedent to the real work of the schools, and I have satisfaction, Mr. Chairman, in presenting to you as the chief speaker of the Department, who will present the paper coming from the Department of Education which will concern you, Mr. Frank H. Wood, the Chief of the Division of Inspections.

Mr. Frank H. Wood, Chief Inspections Division, Department of Education, read the following paper on

THE HYGIENE OF SCHOOLHOUSES.

The various State departments are established and administered with one general object in view, namely, the welfare and prosperity of the State. While each department has its special

function—its own peculiar field of work—it is more or less affected by and more or less directly interested in the work of the others. Moreover, while each has its own distinct province and moves along well defined lines, the work of one often blends into, if it does not to some extent overlap, the work of another.

This statement seems peculiarly applicable to the Departments of Health and Education. The function of the former is to safeguard the health of the citizens of the State, to take proper steps to prevent so far as possible the rise and spread of diseases especially of a contagious or infectious character, and to give necessary aid to restrict and eradicate them when they have secured a foothold. It is a function of the latter to exercise supervision over the 1,300,000 boys and girls in the public schools of the State, to care for their physical as well as their intellectual and moral health and development, indeed to the physical first and foremost. Here it is that these two great departments meet in their work, a place where both have important duties and obligations, where the necessities are urgent and call for continuous effort, and where results of greatest moment await mutual understanding and intelligent, persistent, energetic cooperation.

I speak of the necessities of the case. Let me explain. In the first place, the public schools were established and are maintained at public expense to insure the security, the welfare and prosperity of the State. But these vital ends would not be attained through the establishment of schools if the children were not in attendance. Hence it has been necessary to enact a compulsory education law, requiring children to attend upon instruction between the ages of eight and sixteen. There is no option; parents must send their children to the public schools or provide them equivalent instruction elsewhere at their own expense because the security and the welfare of the State demand it. It follows that while the children are in the public schools, legally removed from the care, oversight and control of the parent, they are the wards of the State. As the State thus becomes sponser for their welfare, its first duty is to see that they are properly housed; that the building is commodious in size, comfortable in its arrangements, cleanly in condition and sanitary in its appointments; that the site is healthful and the surroundings proper. Its own interests as well as the rights and interests of those parents and children

demand that the public school shall be a safe and healthful place wherein to receive instruction.

The State is further interested in this question from another standpoint. The school is the common meeting ground in which all homes and all manner of homes are represented. Seated side by side in the school room, mingling together in play, children peculiarly susceptible as they are to many forms of contagious and infectious disease, must be very effectively protected and safeguarded or the school will become a breeding place of disease instead of a nursery of health. This is a consideration of far-reaching importance, for it concerns the vital interest of all citizens, interest which in their relation to the public school both of these departments are in duty bound to safeguard.

The rights, duties and powers of the State in the premises being granted, the question resolves itself into one of administration. What is being done, what needs to be done and what can be done to accomplish the desired ends are considerations that are especially pertinent, and in discussing them from our standpoint I shall attempt to present some features that appear to me of special interest at this time.

Fortunately there has been some legislation bearing upon this subject that renders effective action in some directions possible and practicable. At the last legislative session, "An Act Relative to Proper Sanitation, Ventilation and Protection from Fire of Schoolhouses" became a law as chapter 281 of the Laws of 1904. This is a measure of uncommon importance, broad in scope, positive in statement and beneficent in purpose and action. By its terms "No schoolhouse shall hereafter be erected in any city of the third class or in any incorporated village or school district of this State and no addition to a school building in any such place shall hereafter be erected, the cost of which shall exceed $500, until the plans and specifications for the same shall have been submitted to the Commissioner of Education and his approval endorsed thereon. Such plans and specifications shall show in detail the ventilation, heating and lighting of such building."

It also prescribes certain minimum standards that must be adhered to, among them the following: Fifteen square feet of floor space and 200 cubic feet of air space for each pupil to be

accommodated in each study or recitation room; a ventilating system that will furnish 30 cubic feet of pure air every minute per pupil; all halls, doors, stairways, seats, passage ways and aisles and all lighting and heating appliances and apparatus to be arranged to facilitate egress in cases of fire or accident, no door being allowed to open immediately upon a flight of stairs, a landing at least the width of the door being required between such stairs and such doorway.

The Commissioner of Education has also adopted some general regulations under this act requiring, for example, that the main light shall come from the pupils' left as seated in the schoolroom and the supplementary light from the rear; that the main windows shall be grouped closely together to afford an even distribution of light on the pupils' desks, avoiding so far as possible areas of light and shadow; that the area of window surface shall equal at least one fifth of the floor surface; that the stairways shall be easy—the risers not more than six and one half inches in height and the treads not less than eleven inches in width.

A circular embodying this act and the regulations and explanations relating thereto was promptly prepared and sent out to the local school authorities to guide them in any work of construction they might undertake. The act took effect April 13, 1904, since which time eighty-seven sets of plans and specifications have received approval. Although many changes and modifications in these plans have been called for before approval could be given, some being rejected in toto, there has been throughout an excellent understanding with the local authorities, an evident appreciation on their part of the importance of the conditions prescribed and a gratifying readiness and desire to comply with them.

This act serves not only to govern and control practically all school buildings and construction that is undertaken outside of cities of the first and second classes, but it is also often the means of inducing needed construction to be undertaken both in the erection of new buildings and in the renovation of old ones. The standards established therein form authoritative units of measure that are easy to apply and present an argument that is difficult to withstand—one that local school authorities are commonly

quite ready to see and appreciate. This measure is therefore an effective lever to employ when occasion requires.

I would not, however, convey the impression that there are no difficulties or obstacles to meet. Their presence is always felt. Troublesome cases of every kind and description are constantly arising, cases that are difficult to adjust, that require tact, patience and persistence all in good measure; some that call for the use of extreme remedial action. No sooner is one case disposed of than another takes its place on the calendar.

Furthermore, there are undoubtedly numerous cases that need attention but do not receive it because they are not reported. It is impossible to reach the smaller schools, especially the district schools, directly through inspection from the office, except in special cases where some complaint has been presented that cannot well be reached through other means, or where some evidence of gross irregularity has been discovered. The consolidated school law clothes the school commissioner with ample power to correct many defects, but even within the range of his authority supplementary effort is needed to remedy unsanitary conditions, for his district is large and his other duties so numerous as to render desired results, which can flow only from close and constant supervision, unusual if not impossible.

Believing that you will be interested to hear about the general character of the cases that call for remedial action, as they are reported from day to day by the Inspections staff, I will give a short abstract from some reports that have recently come to my desk.

Case 1. In a four room building, in three of the four rooms the ratio of window surface to floor surface is as follows: In the first room, 1 to 13; second room, 1 to 16; third room, 1 to 13. On the average this is approximately one third of the minimum amount required. In this building there is no system of ventilation.

Case 2. A one room building, size 21 x 25 x 11½; registration, 60 pupils; floor space per pupil, 8¾ square feet; air space, 100 cubic feet. No system of ventilation. Valuation of the district, $883,867.

Case 3. A four room building; ratio of window surface to floor surface in the different rooms as follows: First room, 1 to

22; second room, 1 to 25; third room, 1 to 11; fourth room, 1 to 20; no system of ventilation; valuation, $845,325.

This does not tell the entire story, because in nearly all these buildings we find that commonly opaque shades are used and they are drawn over the upper half of the window, thus shutting out the best light.

Case 4. A three room building; in the first room a registration of 87; average attendance, 75; room, 24 x 34 x 12, affording 8 square feet of floor space and 100 cubic feet of air space per pupil. The window surface in all of the rooms is below the minimum standard—in two of the rooms little more than one-half of it. There is no system of ventilation and the air for the furnaces is taken from the school rooms; valuation of district, approximately $1,000,000.

In this connection I would add that it is not uncommon to find the air taken either directly from the school rooms or from the cellar. In fact, I found a case last year where the water closets were connected directly with the basement and the odor in the basement was clearly noticeable, and yet the air for the school rooms was taken directly from the basement.

Case 5. First room, 25 x 30 x 9, affording 12 square feet of floor space and 112 cubic feet of air space per pupil; second room, 17 x 25 x 9, affording 10 square feet of floor space and 95 cubic feet of air space per pupil. The inspector adds: "The building itself is in a dilapidated condition. The floors are worn out and dirty as a barn floor. The ventilation is extremely bad, the odor in the two lower rooms was sickening. A ventilating shaft takes the foul air out of the primary room, distributing it into what little pure air there is in the other rooms. The closets are in a wretched condition. They are so near the school building that they are a menace to the health of the children."

Permit an allusion to one further case. The special feature in this is that it has to do with failure to enforce the compulsory education law and to comply with the provisions of the health and decency act. It also mentions the presence of a contagious disease in the school. The linking together of non-attendance, unsanitary water closets and contagious disease is at least suggestive.

As I indicated at the outset these are some of the cases that have come to our attention within a few weeks. In one of these cases, at a special meeting of the inhabitants of the district called at the direction of the Department of Education and attended by the inspector of buildings, Mr. Hall, an appropriation for a new building has been voted within a week. In another a special meeting is called for Saturday evening. In two others special meetings are scheduled for the latter part of the month.

By getting the inhabitants of a school district together and presenting the conditions in a clear, plain, straightforward manner, it usually follows that a favorable vote results. It sometimes happens, however, that two and even three special meetings are called before the desired result is reached.

I have yet to speak of the most troublesome, and from a sanitary standpoint, if not from other standpoints, the most important question for us to consider, namely, the school water-closets. They are an unfailing source of anxiety—a constant menace to health and morals. This is an old, old question, one that our fathers considered, discussed and handed down to us. In a remarkably able manual on education, issued in 1843, Dr. Alonzo Potter of Union College in treating this subject, quotes freely from the reports made in '40 and '41 by special visitors appointed by the State Superintendent in each of the counties, who, to use Dr. Potter's language, "were requested to visit and inspect the schools and report minutely in regard to their state and prospects." These quotations are full of detailed information on the subject and furnish a vivid description of conditions then existing. The author in summing up the matter says: "It is a subject of almost universal complaint that the schoolhouses are without privies. On an average, probably not more than one in twenty of the schoolhouses throughout the State, has this appendage; and in these, it was almost invariably found by the visitors to be in a bad state. This fact speaks volumes of the attention which is paid at these schools to delicacy of manners and refinement of feeling."

Progress has been made in the two generations that have elapsed since this book was published and through the public spirited generosity of an honored citizen furnished to every school district of the State. It is very rare indeed to hear a com-

plaint in these days that no privy or water closet is provided, but the evil still exists in some respects in magnified form. Closets are frequently to be found without doors, without windows, dwarfed and cramped in size, scandalously disfigured, filthy beyond all description—a prolific source of disease and moral degradation. This part of the school property that needs to receive most care, commonly receives the least. Instead of receiving constant, assiduous attention it is often entirely ignored.

The difficulty lies not so much in lack of power to correct deficiencies of this kind as in the means to discover them—not so much in ability to apply a proper remedy as to prevent repeated recurrences.

In 1887 a measure known as the "Health and Decency Act," one of the most humane and beneficent laws ever enacted, was placed upon the statute book at the instance of my honored chief, Commissioner Draper, then State Superintendent of Public Instruction. The provisions of this measure are broad and comprehensive in scope, effective in the remedy prescribed and easy of application and enforcement. Let me take time to read this measure, it is short:

"The trustee or trustees in the several school districts shall provide suitable and convenient water-closets or privies for each of the schools under their charge, at least two in number, which shall be entirely separated each from the other and having separate means of access, and the approaches thereto shall be separated by a substantial close fence not less than seven feet in height. It shall be the duty of the trustee or trustees aforesaid to keep the same in a clean and wholesome condition, and a failure to comply with the foregoing provisions of this section on the part of such trustee or trustees, shall be sufficient ground for his or their removal from office, and for withholding from the district any share of the public moneys of the State. Any expense incurred by such trustee or trustees in carrying out the requirements of this act shall be a charge upon the district, when such expense shall have been approved by the school commissioner of the district within which the school district is located, and a tax may be levied therefor without a vote of the district."

If the local school authorities fail to comply with the provisions of this act when called to their attention, an order to the super-

visor to withhold the public money from the district is a penalty easy to enforce and unfailing in its results.

But the real difficulty, as I have already intimated, lies in the far-reaching magnitude of the problem, not in meeting isolated cases that are called to attention. Outside of the cities there are 10,651 school districts in the State, 10,000 of which approximately we are unable to reach through direct inspection. In the Department of Education twelve inspectors are employed, whose time is necessarily devoted to the 800 schools of academic grade, to the training classes, training schools, colleges and universities, technical and professional schools and schools for defectives. These inspectors have been instructed to give first attention to sanitary conditions, especially to the closets and toilet rooms. But an annual inspection is by no means sufficient in all cases to insure compliance with sanitary requirements even in this limited number of institutions.

Trustees and school boards are as a rule not versed in the subject of school sanitation. They are men of affairs, serve without pay and have very little time to devote to the needs of the school. In the common school districts, over 9,000 in number, they visit the school infrequently if at all. They are consequently ignorant of conditions and are naturally disposed to let matters of this kind take their own course. But a few days ago a certain trustee took exception to the description of the school building as set forth in an inspector's report, but upon going to the building subsequently confessed that he was mistaken; that the description was accurate, and explained the matter by saying that he had not been in the building before in years except by the light of a lantern on the night of school meeting.

When violations are called to the attention of local school authorities they are usually corrected with reasonable promptness, but commonly there is soon a lapse into former conditions.

The question naturally arises, what further can be done to better conditions? In the first place the public, especially the men holding official relations to the school, should be instructed and enlightened on these matters. With this end in view we planned some time ago to issue a circular on the sanitary condition of school buildings, giving especial attention to the construction and care of water-closets. When this circular is put into

form and approved by the State Commissioner of Health, it will be sent to all school commissioners, trustees and boards of education for their information and guidance. In addition to this I am persuaded that every warrantable opportunity should be employed through official publications, the press and platform, to agitate this matter and educate public sentiment. If proper conditions do not then obtain, ignorance can certainly be no longer urged as an excuse.

Permit one further suggestion: There can and should be a full and complete understanding and intelligent, persistent cooperation between the two departments that we respectively represent. By united, determined action we can make rapid headway in improving the general situation. If every health officer were periodically to make a careful inspection of the sanitary condition of the school buildings in the town that he represents and report to the State Department of Health, the Commissioner of Health would be able to put us in possession of invaluable information that could be used effectively in checking the infraction of school laws and in making the school homes of our boys and girls safe and respectable.

In conclusion permit me to say that the Inspections Division of the Department of Education is keenly live to the importance of securing and maintaining proper sanitary conditions in and about school buildings and will thoroughly appreciate all aid and assistance that it may receive through the State Department of Health in furtherance of this great and important object.

Dr. Lewis—I may be permitted to state that this paper was presented because I believed that you as sanitary officers would be interested in the condition of the schoolhouses in your own jurisdiction, and that through you there might be a large amount of information sent here that would be useful in correcting existing unsanitary conditions. I am sure that we have been exceedingly interested in the presentation of the subject, and I would be pleased to hear from you in regard to the matter. The paper is now open for discussion. Is Dr. Veeder present?

Dr. Veeder (of Lyons):

Mr. Commissioner and Gentlemen—I have come in contact with this subject in a rather exaggerated form and the experience tends to emphasize everything that has been said by the speaker.

About fifteen years ago there was erected a school building, costing perhaps $50,000, and $10,000 in addition for heating and ventilation. At that time I was not connected with the board of health of the village, but was connected with the town board, and the town, after a few years, began to fill up from October with all kinds of sickness among the children, diarrheal troubles, fevers, sore throats of all kinds, diphtheria outbreaks in the town, and every effort being made to discover and remedy the evil. Right in the midst of it I was put in as health officer and strenuous efforts were made to overcome the difficulty. Quarantine regulations were enforced up to the very limit. Bacteriological examinations were made and all that sort of thing as thoroughly as we knew how to do it, and yet there was no abatement year after year, so that at times there would be as many as twenty pupils out of a single grade ill with diphtheria or some other disease of the type that I have mentioned.

It occurred to me that a new system of heating that had been put into that building might perhaps be responsible, so without saying anything to anyone I went to the building during intermission, during a teachers' institute, and I found a state of affairs that was to me simply astounding. It was a system in which the air is taken from the rooms and taken to long vaults in which the febrile matter is deposited in sieves and dried out, and then they kept up the circulation down to these vaults and up through the flue. It was vacation; and when the fires were lighted in the stack furnace, all this febrile matter which had been accumulating for years, deposited in these cellars and vaults, with a flue leading to every room in the building, and the whole thing, from top to bottom, smelling as foul as any of these water-closets or privies that have been mentioned by the speaker. I say I was astounded to see the state of affairs. I went immediately across the street and brought one of the trustees. The assistant janitor had in the meantime started a fire with shavings, as he knew it was wrong to allow that building to become polluted in that way.

In a very different spirit from that shown by the Commissioner of Education and the writer of the paper, the president of the board of education went to fighting the thing and wrote pamphlets and said it was all right and that a healthy smell of that kind

did no harm. Well, the board of health got up on their ear, to use a common expression, and I caused the school to be scoured and cleaned, and there was agitation for a sewer system, but it seemed impracticable to carry out these measures; so the question was how to clean the thing out, and it was followed up. There were no sewers put in, but that material was not allowed to accumulate through a single vacation. The stack fires were kept running, and in addition to that, the cellars were washed with a spraying machine that threw whitewash mixed with carbolic acid over every inch of it, was as white as snow (whiter than a good deal of the snow in the city) and clean, and the febrile matter was cleaned every week with a solution of sulphate of copper, one pound for every ten gallons of water, sprinkled over with a broom, and there were no more odors any more than there are in this room, and the change in regard to sickness in that community was just about as astounding as the condition of affairs that had existed since that has been looked after. The board of education pay some one to look after it now.

I asked the truant officer what sickness there had been at the opening of the school this fall. One case of any seriousness, and that originated in a neighboring town. Last year I find it was the same thing, showing that there is a possibility, under the most adverse circumstances, if there is an effort made, to remedy a condition of affairs as bad as that was. I am sure it was a bad condition of affairs, and you can see that even the best system is always liable to go wrong and has to be watched, and eternal vigilance in a case of that kind is all that keeps it from going wrong.

This is an isolated instance, illustrating the point made in the paper by the speaker.

Dr. Lewis—Is there any further discussion?

Dr. Phillips—I would like to ask one question, in relation to drawing cold air for the purpose of heating it for the benefit of a schoolroom,—whether it is proper to draw the cold air from the schoolroom itself and reheat it for the purpose of producing sufficient heat in the schoolroom to keep the pupils warm. I know that has been done and I think it is done at our place,—whether that is a proper way of doing?

Dr. Lewis—That is a very pertinent question, Doctor. I think Mr. Wood could answer that at once.

Mr. Wood—We take it for granted that it is not.

Dr. Lewis—I have seen many a schoolhouse like that. I am going to ask you to vote on this question pretty soon; so you had better be thinking. Anybody else anything to say?

Dr. Bowman (of Horseheads)—I would say that the gentleman would find that it is harder work to heat a building where the air is reheated over and over than where you have fresh air. It will take more fuel. I know that from observation.

Then I would like to ask about keeping the floors clean. If I was building a new schoolhouse I would have a hard wood floor and keep it oiled to keep the dust from rising; but many of our schoolhouses have hemlock floors and those are half worn; and in cleaning the floors I would like to ask what is a good method. I will volunteer one: We use damp sawdust and oil the floor. If there is any other or better method I would like to know it.

Dr. Lewis—Do your regulations deal with the floor material, the kind of material to be used in floors, hard or soft wood?

Mr. Wood—No, not specifically.

Dr. Lewis—Can anyone answer the doctor?

Dr. Vedder (of St. Johnsville)—I am a member of the school board of St. Johnsville. We had occasion to look our floors over in one building last year and I suggested that they put on boiled oil as hot as possible, and we have had splendid results from it. It prevents any dust from accumulating. Put on plenty of it. I think we put on three coats, and we have had no trouble since with dust or dirt, and the odor of the building is fine. It is hardly possible to have any dust in that way,—plenty of boiled oil put on hot.

Dr. Lewis—Have you any suggestions to make regarding the best method of cleaning floors?

Dr. Vedder—We simply have the floors mopped off once a week and swept every day. The floor is perfectly clean. We simply put on that boiled oil.

Dr. Lewis—How often does that need renewing?

Dr. Vedder—We haven't renewed it since vacation. I suppose we will soon, but it is in good condition at the present time.

Dr. Patchen (of Dansville)—I would like to ask the gentleman if that treatment would apply to hemlock floors?

Dr. Vedder—It would apply to any soft wood floor, except I think it would not apply well to a Georgia pine floor, but it would to any other soft wood and also hard wood,—especially birch.

Dr. Lewis—Dr. Greene, you act as if you wanted to say something.

Dr. Greene (of Buffalo)—No, sir. Mr. Chairman, I have nothing to say upon this subject except what has been said, but this: In the city of Buffalo there is a great objection on the part of the lady teachers to having the floors oiled. I have that very often come to me,—that it spoils their skirts, and they have to wear short skirts, or else the floors must not be oiled.

As to the sanitary condition I think it is improved very much by oiling the floor, as certainly the dust is prevented from spreading.

Dr. Vedder—If you will boil your oil it will save your lady.

Dr. Evans—I would like to call attention to one item that has always seemed to me very important, and that is the common drinking pail and cup of the schoolroom. I have discovered, I think to my perfect satisfaction, that oftentimes diseases of an infectious character have been communicated in that way, and if some remedy could be suggested, in my judgment it would be a great advance for all of us.

Dr. McClelland (of Saranac Lake)—Let me inform you that in our schools we don't use either a pail or a cup, but we use a flowing stream, and the pupil is required to drink from that stream. That is the manner in which we deal with that matter.

Dr. Lewis—In the schools at Saranac Lake?

Dr. McClelland—Yes, sir.

Dr. Lewis—You have plenty of water up there.

Dr. McClelland—Yes, sir; we have plenty of water.

Dr. Lewis—Now gentlemen here is the question: I know as well as any one the various duties which devolve upon the health officer. I have heard rumors of the somewhat inadequate compensation which is sometimes meted out to health officers for such services, and yet in a public matter of this kind, where the health officer is a practicing physician and traveling about through the town, is it not possible for you, as public spirited citizens, to inspect at times schoolhouses, especially in regard to the matters which Mr. Wood has set forth in his paper. My impression was, in discussing the question with Mr. Wood some months ago, that you would be willing to volunteer to do what you consistently could in the matter, to aid in this work of making the surroundings of schoolhouses sanitary, or at least giving the information which would result in abuses being corrected.

Now those of you who believe that I was justified in making that statement will please rise and let us see how you look.

(The convention arose in a body.)

Dr. Lewis—Dr. Draper, that is nearly a unanimous vote.

Dr. Draper—I think, Mr. Commissioner, it was entirely so.

Dr. Lewis—Mr. Wood, would you like to say anything further before we pass to the next subject?

Mr. Wood—Nothing further, I think.

Dr. Draper—Mr. Commissioner, I think I ought to make my acknowledgment for the unanimity and cordiality of this vote. I have supposed always that doctors had permission, without any invitation or any special arrangement about it, or any special understanding about it, to do what they could to maintain the general health of the community in which they lived. It is a part of the general business of the medical profession to look after everything in the community that goes toward physical, mental and moral cleanliness, and the doctor who does not attend to all of these things pretty well is not upholding the medical profession as well as he ought to, and when he does look after those things pretty well is upholding his own reputation pretty thoroughly and putting not only the Education Department but all the people of the community in which he lives and of the State with which he is associated under obligations to him for doing it.

We have got a great State here, and if we could join the medical profession and the teaching profession pretty sharply together all over this State we would make a very much greater one of it before many years.

Dr. Lewis—We knew that before, Dr. Draper. There is one thing more. This Department, some three or four years ago adopted a plan whereby the principals of the schools could discover defective eyesight in the scholars. We followed the example of some other states which had already taken such action.

Dr. Callan, of the New York Eye and Ear Infirmary, formulated a plan. We have been ready to make such examination, at least to furnish the outfit and instructions for school purposes. That work has been done in a number of schools, and we get a report of such examinations, showing that nearly 25 per cent. of the children examined prove to have defective vision. That work has not been done perhaps as thoroughly as it might have been done, had the simplicity of the examination necessary been perfectly understood. I have asked Dr. Callan to come here to-day and make a few remarks on the subject while Dr. Draper was here to listen to it. Dr. Callan is Consulting Ophthalmologist of this Department.

Dr. P. A. Callan, surgeon to the New York Eye and Ear Infirmary, spoke as follows on

TESTING THE EYES OF SCHOOL CHILDREN.

Ladies and Gentlemen—As your Commissioner remarked, at his suggestion, I devised a scheme for the examination of school children's eyes by the teachers. It was intended solely for localities where there was no expert help to be obtained. New York city and Philadelphia and many of the larger cities now have that attended to by experts who devote so many hours daily to the schools.

I won't detain you with any long extended remarks, but a little historical retrospect may be of service. About forty years ago the first examinations were made on the continent of Europe. They were made for the purpose of determining how many children became nearsighted in the schools. That is what struck them most there. Germany started it, and the United States,

Italy, Russia and nearly every continental country followed out the plan of examining the eyes of their school children. The most indefatigable worker was Dr. Cohn, of Breslau. He personally examined some 10,000 children. He found in the dorf or village school 1 per cent. of nearsightedness. This gradually increased as the child progressed forward from grade to grade, in the towns and cities, until finally, in some of the classes in the German universities, there existed as high as eighty per cent. of nearsightedness.

In 1874 the first examination was made in this country, and I made it, in New York city, on the eyes of colored children (we had then separate schools for colored children) and I found in the primary schools, among the younger children, one per cent. of nearsightedness, and among the older children three per cent.

Subsequently to that, the late Dr. Agnew examined the College of the City of New York, and found as high as fifty per cent. in the senior class.

If you will allow me a few moments I would like to explain to you that there is something else besides nearsightedness. It is needless to remark that all physicians know about *reflex* disturbances. Reflex disturbances do not alone come from nearsighted eyes, but farsighted eyes also, or eyes with astigmatism. We adopt a standard and call it the normal eye. It rarely exists. That is to say an absolutely perfect human eye rarely exists; there is rarely an absolutely perfect normal eye except as an accident.

We have two *deviations*,—we have the farsighted eye, which has a *short* antero posterior diameter. Then we have the nearsighted eye, where the eyeball is too long, where the antero posterior diameter is longer than the normal eye. Each of these has subdivisions, where the surfaces and curves are not uniform. We call that astigmatism.

The examinations of thirty or forty years ago were made for the purpose of finding out how many eyes were defective from nearsight; but it is of great importance, and, *many* times, of more importance, to eliminate the errors, for instance *of* astigmatism, especially farsighted astigmatism. More reflex disturbances come from farsightedness and farsighted astigmatism than the ordinary nearsightedness.

I might make a few remarks further to the effect that the normal eye, so to speak, the natural eye, existing in a state of nature, among the savage tribes and barbarous races, is the far-sighted eye. It is the *vices* of civilization that cause the near-sighted eyes. In our schools most of the studying is done through the eyesight. In the early days and among the savage and barbarous tribes you never find the nearsighted eye. It is those eyes especially that I refer to. You can regulate the nearsighted eye, but it is difficult to deal with the eyes where it is difficult to see anything which you call farsightedness.

My remarks are simply a plea for the eyes of our school children. It is hard to expect to do good work where the means to do it are so imperfect. Eighty or ninety per cent.—I can safely say ninety per cent.—of the children in the United States are farsighted. That is to say, if it is of small account, it can be ignored, but if there is a large amount of this defect, it is a constant torture. Such children are constantly tormented with sick headaches, etc. They are called stupid and dull. So would we all be if we undertook to use our eyes when they were in that condition.

Now, in regard to the ordinary work of testing. Each teacher tests his class in the following manner. (Exhibits card with letters of various sizes.) These letters, if you will notice, are ranged in a common sequence,—the highest, and then gradually diminishing until the lowest you can see at ten feet. The top letter should be seen at two hundred feet, the next one hundred, seventy, fifty, forty, thirty, twenty, fifteen and ten feet.

Now, this will eliminate the gross errors. Each child brought into the room comes in separately, and the teacher having this on the wall, will ask the pupil to name the letters in each line in rotation, beginning above and naming down, each one, covering one eye at a time. We will say that twenty feet is shown as a standard. If it is read at twenty feet, you put the distance 20/20, or normal. If the pupil only sees thirty feet at twenty feet, you put two thirds, 20/20, and so on. It is not very exact.

This is only average sight. The majority ought to see much better. But it is the standard, and as such is of great service in eliminating gross errors.

Now, when a teacher finds a pupil only sees two thirds in one eye or both eyes, or even less, the principal is notified and he sends a card to the parents or guardian, saying: "Your son's or daughter's eyes are defective and should be examined by an eye surgeon."

In the larger cities provision is made for a more thorough examination; but I think every school in the State where there are no expert examiners should be looked after. In most of the cases of weak-eyed children, who are punished at home or looked upon as stupid and dull, it is really not their fault. Not only are they made sick, but they almost despair, and I think we would all be playing hookey if we had to do the work that some of them have to do with their imperfect eyes.

If the chairman will allow me, I will test his eyes. This is supposed to be against the wall, so that the light strikes it, not between windows; and one eye is covered, and he is asked to repeat the letters on the *lines* all the way down.

Dr. Lewis.—I am not a good subject. I can't see any of them very well. G, K, H, S, T,—That is as far as I can go.

Dr. Callan.—His distance is two sevenths. That should be seen at seventy feet, and the doctor sees it at scant twenty feet.

I am very glad of the opportunity to appear before you, to interest you as physicians to call attention in the various communities to the easy manner of doing this, and the great importance. I thank you very much for your kind attention. (Applause.)

Dr. Lewis—These test types and circulars of instruction and so on are in the office ready to supply any school principal or school authorities who apply for them, simply on condition that we get a report of the examinations, when made.

Is there any discussion?

Dr. Phillips—Would you recommend that the health officer request the teachers of our public schools to make this test and report it to the Commissioner, yourself? Is that the object?

Dr. Lewis—We would have the health officer, when opportunity offers, inform the school principal that such things are here to be had, to be utilized by the schools. I should be very much

pleased to have the question brought to the attention of your school authorities in charge of your municipalities.

Dr. Clark—I think, Mr. Commissioner, the school authorities have instructed most of the schools in the State on that point. I find in the schools of my own city that all the teachers have these cards and test their children, and as they find them lacking, send a note to their parents.

Dr. Lewis—I presume that is true in the cities,—I don't doubt that; but it may not be in the country districts.

There is one other question which interests the school authorities,—the law regarding the vaccination of school children, or the exclusion of the children from the schools until they have been vaccinated. Inasmuch as that question has lately passed through the courts and been finally decided, I have asked Mr. Church, Deputy Attorney General, to be present and give us the gist of the decision, or any other matters pertinent thereto which Mr. Church wishes to give us.

Deputy Attorney General Sanford T. Church spoke as follows, on

THE PRESENT STATUS OF THE LAW RELATING TO THE VACCINATION OF SCHOOL CHILDREN.

LADIES AND GENTLEMEN AND MR. COMMISSIONER: I have been at a loss ever since I was requested to read a paper at this meeting to determine just why the Commissioner asked me to read this paper, but in view of the fact that I read a paper at your last meeting, a little over a year ago, I made up my mind that I was in the position of the boy who went into the frog business. Out in Chicago there was a commission merchant who received a letter from a boy asking what they would pay for frogs, and he wrote back and asked the boy how many he could furnish. He said thirty thousand dozen, and was told to go ahead and furnish them. About three weeks after that the firm got a letter from the boy saying: Dear Sirs: I send you by express three dozen frogs. It was all I could get. I was deceived by their hollering."

But, whatever the reason may have been, I am very glad that I have the opportunity of addressing you.

The title of my subject and the fact that I am a lawyer will render it almost unnecessary for me to state that I shall treat the subject, in talking to a learned body of medical practitioners, strictly from a legal standpoint. I realize, however, the difficulty which confronts the medical practitioner in reference to vaccination, and particularly vaccination of school children. It is a comparatively simple proposition for a physician to treat a sick person, compared with undertaking to prescribe for a well person, and it is even more difficult where the person to be treated is a child, in good health and the idol of its doting parents.

It is therefore essential that the medical man should know just what his rights are in connection with vaccination, and just how far the school authorities or the health authorities may go in excluding unvaccinated children from the schools of the State.

I shall endeavor to inoculate this paper with the virus of brevity, and sincerely trust, as I have no doubt you do also, that it will work.

Vaccination has long been recognized by various countries as a preventative measure and a safeguard against the ravages of smallpox. England has had a national vaccinating establishment, and penalties have been prescribed for every parent or person having the care and custody of a child born in the country who did not, within three months after the birth of such child, cause it to be vaccinated by the public vaccinator.

As early as 1807, Bavaria passed a compulsory vaccination act; Denmark in 1810, Sweden in 1814, and numerous other German states early in the nineteenth century.

In Massachusetts there is an act which compels parents and guardians to have children vaccinated before they are two years old, and provides a fine of five dollars for each year thereafter wherein vaccination is neglected.

Various cities have, for a long time, had in force strict ordinances in regard to vaccination.

Thus we find that, while vaccination is compulsory in comparatively but few states and countries, it is recognized in nearly all the civilized world.

The first statute of this State recognizing vaccination as a condition of allowing children to attend the public schools of this State is found in Chapter 438 of the laws of 1860, which gives to the local boards of the common school governments the right to exclude unvaccinated children from the public schools of the State. This act was the forerunner of the present provision of the Public Health Law upon the same subject, which is found in section 210 of such law, which was renumbered by Chapter 667 of the laws of 1900; and as this statute is the one in existence today which requires the vaccination of school children, I shall quote it in full. It reads as follows:

"No child or person not vaccinated shall be admitted or received into any of the public schools of the State, and the trustees or other officers having the charge, management or control of such schools shall cause this provision of law to be enforced. They may adopt a resolution excluding such children and persons not vaccinated from such school until vaccinated, and when any such resolution has been adopted, they shall give at least teu days' notice thereof, by posting copies of the same in at least two public and conspicuous places within the limits of the school government, and shall announce therein that due provisions have been made, specifying it, for the vaccination of any child or person of suitable age desiring to attend the school, and whose parents or guardians are unable to procure vaccination for them, or who are, by reason of poverty, exempted from taxation in such district."

It is, therefore, quite clear that the Legislature has recognized vaccination as a preventative of the spread of disease, and has attempted to say, by the above statute, that children shall be denied the right to attend the public schools of this State unless they have first submitted to vaccination.

The question that at once occurs to us is: May the Legislature do this thing? Is it within the letter and spirit of the Constitution? May the right to a common school education at the hands of the public be taken away from the children of the State?

If this statute is valid it is valid as an exercise of the police power, in one of the legitimate and most important functions of government, viz: the preservation and promotion of the safety and health of the public. The police power unquestionably exists

to enable the government to make such necessary restrictions touching the well-being of society as may become necessary, having regard only to the fact that citizens must be preserved from unjust and arbitrary interference.

In the case of Health Department vs. Rector, 145 N. Y., page 32, Judge Peckham says in the course of his opinion: "We may own our property absolutely, and yet it is subject to the proper exercise of the police power. We have surrendered to that extent our right to its unrestricted use. It must be so used as not improperly to cause harm to our neighbors, including in that description the public generally."

And what he says in regard to property rights might also be said in regard to personal rights. Again, in the same case, he says: "The act must tend in some appreciable and clear way toward the accomplishment of some one of the purposes which the Legislature has a right to accomplish under the exercise of the police power."

The act in question does, beyond doubt, deal with a subject with which the Legislature had an unquestionable right to deal,– the subject of the public health. It is generally conceded (although there are still "Doubting Thomases" both in the medical profession and out of it) that vaccination does, to a greater or less extent, prevent the spread of one of the most contagious diseases known to the world, that of smallpox; and it must also be a matter of general knowledge that, where many children are gathered together, there could be no more easy way for the spread of contagion than through children assembled there.

The contention has been at various times made that the statute above quoted, or the one upon which it was founded, was unconstitutional, in that it violated article I of section 1 of the State Constitution, which provides that, "No member of this State shall be disfranchised or deprived of any of the rights or privileges secured to any citizens thereof, unless by the law of the land or the judgment of his peers;" or that it violated the provision of section 1 of the Fourteenth Amendment of the Constitution of the United States, which is as follows:

"All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the state wherein they reside. No state shall make

or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty or property, without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws."

The courts, however, have disposed of these constitutional questions, so that there can no longer be any room for doubt upon the subject. We may answer the questions which arose in our minds, by direct straightforward answers, and refer to decisions of the highest court in the State as our authority therefor. The Legislature may pass such an act, and when so passed the same is constitutional, and may be enforced.

First of all, it has been held that a common school education at the expense of the State is a privilege, rather than a right, and that, being a privilege, it is always subject to the discretion of the State, and might be granted or refused to any individual or class, at the pleasure of the State.

See People ex rel. King vs. Gallagher, 93 N. Y., 438.

To the same effect is The Matter of Walters, 84 Hun, page 457. In that case an application was made for a peremptory writ of mandamus, compelling the principal of public school no. 22, in the city of Brooklyn, to admit two children to such school. Under the rules and regulations of the Board of Education, "when a child is presented for admission to a public school of this city, the principal shall require a physician's certificate that he or she has been satisfactorily vaccinated or has had the smallpox, or in default thereof, shall exclude the child until such evidence is provided."

The avowed purpose of the proceeding was to test the constitutionality of the provision of the Public Health Law above quoted. The court said, after citing King vs. Gallagher, above referred to: "It follows that the State can certainly exercise this discretion by debarring from attendance at the public schools such persons as are unwilling to adopt a protection which in the judgment of the Legislature is essential to the preservation of the health of the large body of scholars."

The court, however, goes on to say: "To vaccinate a person against his will, without legal authority so to do, would be an assault."

It was contended in this case that the fact that there was in existence in this State a statute which compelled the attendance of children of a certain age upon the public schools of the State, would have the effect of obliging school children to submit to an assault upon the part of the authorities. The court, however, did not pass upon that question, and it would, therefore, seem to remain undecided. I am, however, inclined to the opinion that, where the school authorities have passed the resolution provided for by section 210, and persons not vaccinated are thereby excluded from the schools, that such resolution, arising as it does in the exercise of the police power and for the protection of the public health, would, while in force, prevail over the provisions of the Compulsory Education Law, and would therefore, operate as an ample excuse for any child or children who might be arrested and brought before a magistrate, under the provisions of the act requiring attendance.

The question as to whether vaccination might be enforced, regardless of the right to attendance upon a public school; in other words, whether the health authorities might compel vaccination by force, is one that is not within the province of this paper, but I beg to call the attention of the health officers here gathered together to the significant language of Judge Bartlett as above quoted, viz: "To vaccinate a person against his will, without legal authority so to do, would be an assault," and to warn them that, in my judgment, there must be a clear case of an existing epidemic, the public necessity must be great, and the patient upon whom force is used in order to vaccinate, must be one who has beyond question been exposed to the smallpox.

But to return to my legitimate subject: The Court of Appeals of this State has, in a case decided as late as October 18, 1904, upheld squarely the provisions of section 210 of the Health Law as constitutional and valid, and a reasonable and proper exercise of the police power.

This case is entitled Viemeister vs. White, President of Board of Education, et al, and is so far only reported in the advance sheets of the reports. As this is so recent and so important a decision, I shall quote freely from the opinion of Judge Vann.

The proceeding was one to compel the officers having charge of a public school in Queens county to admit a boy ten years of age to the school without requiring vaccination. The court said:

"The question presented is whether the Legislature is prohibited by the Constitution from enacting that such children as have not been vaccinated shall be excluded from the public schools. The appellant claims that the Public Health Law places an unreasonable restriction upon the right of his child to attend school, and that it violates the section of the Constitution already quoted (article IX, section 1, which requires the Legislature to 'provide for the maintenance and support of a system of free common schools wherein all the children of the State may be educated') as well as the general guaranties for the protection of the rights, privileges and liberties of the citizen. The respondents claim that the object and effect of such legislation is the protection of the public health, and hence that it is a valid exercise of the police power. The police power, which belongs to every sovereign state, may be exerted by the Legislature subject to the limitations of the Constitution, whenever the exercise thereof will promote the public health, safety or welfare. The power of the Legislature to decide what laws are necessary to secure these objects is subject to the power of the courts to decide whether an act purporting to promote the public health or safety has such a reasonable connection therewith as to appear upon inspection to be adapted to that end. A statute entitled a health law must be a health law in fact as well as in name, and must not attempt in the name of the police power to effect a purpose having no adequate connection with the common good."

And again:

"When the sole object and general tendency of legislation is to promote the public health, there is no invasion of the Constitution, even if the enforcement of the law interferes to some extent with liberty or property."

And once more:

"The right to attend the public schools of the State is necessarily subject to some restrictions and limitations in the interest of the public health. * * * Smallpox is known of all to be

a dangerous and contagious disease. If vaccination strongly tends to prevent the transmission or spread of this disease, it logically follows that children may be refused admission to the public schools until they have been vaccinated. * * *

"The relator's son is excluded from the school only until he complies with the law passed to protect the health of all, himself and his family included. No right conferred or secured by the Constitution was violated by that law, or by the action of the school authorities based thereon."

We may, therefore, unqualifiedly assert that the statute above quoted, requiring all children to become vaccinated as a condition precedent to their attendance upon the public schools of this State, is valid and constitutional, and a proper exercise of the police power.

The fact should not be overlooked that there are many schools in this State which are not public schools in any sense of the word; and the question would then arise as to what extent schools other than public schools would have the right to exclude unvaccinated children. A careful examination of the decisions and the statutes would seem to show that there is no authority on the part of the school authorities to compel children in attendance upon private schools to be vaccinated as a condition of such attendance.

It will be noted that section 210, above quoted, applies only to public schools, and a public school, in the sense therein used, means the common schools of the State, supported at public expense and under public supervision. It would seem, however, that in cases of epidemic, or threatened epidemic, the health authorities might reach even such schools by compelling vaccination to prevent the spread of smallpox.

In order to warrant this, however, the facts must exist which would justify the order of the local health authorities, requiring such vaccination. There must be smallpox in the vicinity, and the pupils of the school must either have been actually exposed to the disease or have been liable to exposure thereto.

It will be seen from the above that compulsory vaccination for school children has become an established fact in this State and has the sanction of our highest court. While there may still be those who question the efficacy of vaccination, yet I think the

majority will concede that this is a step in the right direction; if it tends, ever so little, to guard the health and welfare of the public, and prevents, even in a small degree, the spread of that dread disease, the very mention of which pales the cheek of the bravest, it has accomplished much, and we owe to the Legislature which passed the act requiring such vaccination, and to the court that upheld it, a vote of thanks for what they have done in the way of bettering the welfare of the people of this great State.

Dr. Lewis—Do any of you gentlemen wish to discuss Mr. Church's paper?

Delegate—In case the parent or guardian refuses to have the child vaccinated, and it remains away from school—what remedies are there for that dilemma? The truant officer is prohibited from sending the child to school and the school authorities report that the child is absent from school.

Mr. Church—I endeavored to bring out that point in my paper, to the effect that where a board of education had adopted a rule under section 210, that all children not vaccinated should be excluded, and that resolution conflicted with the Compulsory Education Law, that I believed that you were without remedy so far as enforcing attendance is concerned; that the statutes would seem to clash, and the health statute would prevail over the compulsory education statute.

Delegate—If the parents refused to have the child vaccinated, the child might go one, two or three or five years without attending school.

Mr. Church—That seems to be the situation under the present state of the law. Those two statutes seem to run right square up against each other.

Dr. McClelland—I would like to ask whether a board of health would be justified in placing a penalty on the parent or guardian of a child who was left in that condition?

Mr. Church—I don't know of any statute now which authorizes you to enforce any such penalty. I think in cases where an epidemic existed that possibly the courts would uphold such a thing, but that would be the only case.

Dr. McClelland—It seems to me that where a child runs at large and comes in contact with the children in the streets every day,

it is almost as much of a menace as the child in the school,—not quite but very nearly.

Dr. Miller—In our present epidemic of smallpox I received a letter from Dr. Curtis stating that I must enforce the school law, see that it was enforced, and I was honored with a visit from Commissioner Lewis on Saturday last. I asked him the question, "How can we force an unwilling school board to take the proper action, enforcing the school law?" They are unwilling on account of personal reasons, not believing in vaccination. How am I to make them enforce that law? At present the school law has not been enforced for a number of years, and it is only the board of education that is standing in the way and they have given instructions to the principal to stand pat. Commissioner Lewis gave me some advice, but it didn't work.

Mr. Church—You are in a rather difficult position, Doctor. If you have an epidemic, it seems to me that the only thing left for you under the general statutes would be for the local board to take hold of the matter and shut up the school independent of the school authorities; but you would have to have your facts in order to justify that. You would have to have the existence of an epidemic.

Dr. Miller—We have had three cases and if we shut up the school we will do our town an injustice. It will create a greater scare and will do the business part of the town an injustice.

Mr. Church—Won't it bring about vaccination?

Dr. Miller—I think not. I think the board are like a stone wall. Have the school commissioners or the school authorities the right to admit any child without vaccination? Have they any discretion in the matter?

Mr. Church—If you pay close attention to the language of the statute: "No child or person not vaccinated shall be admitted or received into any of the public schools of the state, and the trustees or other officers having the charge, management or control of such school shall cause this provision of law to be enforced."

That would seem to be mandatory up to that point, if they don't amend it any further. But they went further. They say, "They may adopt a resolution excluding children and persons not vaccinated from such school until vaccinated, and when

any such resolution has been adopted, they shall give at least ten days notice thereof by posting copies of the same in at least two public and conspicuous places within the limits of the school government," etc.

You see the Legislature went too far. In that last sentence they seem to have left it open to a resolution.

Dr. Miller—Yes, sir. Now the next point is: Under that law, can the school commissioners admit to a school a child which has been furnished with a medical certificate saying that it is not in fit condition for vaccination? There is another question and it is one that has been very much abused.

Mr. Church—There seems to be no provision in the statute for exempting any person, whether they have a medical certificate or not, from this provision.

A delegate—Within the past ten days I have been in communication with the State Department of Education on this very same question. We have just had a case of variola. I have endeavored to have the unvaccinated children excluded from the school. I met a board of education opposed to it. I have investigated the matter and have brought up the law to them. I was uncertain as regards the constitutionality of the law until the Court of Appeals rendered a decision. I had not ever learned of the decision up to today. I have done all in my power to have the unvaccinated children excluded from the school. They have put up proposition after proposition. I have put it to the State Department of Education and received an opinion and explained it to them. Where the laws apparently clashed, I explained that as explained to me by the State Department of Education, but nevertheless they declined to exclude from the school unvaccinated children.

Now if we have an epidemic of variola, I am the man that is going to get the blame. I want to get it off my shoulders. I want to get the board of education to do that. If they will exclude from the school the unvaccinated children, all well and good, but if not, who is to blame in this matter? How can they be compelled and who can compel them to enforce this law, or shall it not be enforced? What is it there for? And how about the two sentences of this section of the law? The first sentence reads that it is compulsory and then the second sentence says

there is a little leeway, they haven't got to do it. I want to know if they have or not. If they have not, all well and good, but who is to blame for it?

As regards the clashing of the two laws, in the opinion of the State Department of Education, I find that that Department holds that any child that is physically able to attend the public school is physically able to be vaccinated, and if the parent of the child declines to permit that child to be vaccinated and he is excluded from the school because he is physically unable to attend school, he is physically unfit to attend school, because of the fact that he is not vaccinated, and through that he is a menace to the other children of the school.

Section 3, as I understand it, of the Compulsory Education Law (I have never read the law through) makes special provision for the compulsory education of children who are physically unable or unfit to attend school. As I understand the Compulsory Education Law, all children between the ages of 8 and 14 physically able to attend school must do so. Those who are physically unfit to attend school must be furnished by the guardian or parent with equivalent instruction either at home or at some private school, and at the State Department of Education I am informed that they consider a child who is unvaccinated to come under that section; that it is still the duty of the board of education, through its truant officer, to see that the guardian or parent of that child furnishes equivalent instruction to the unvaccinated child. That is the way the two laws probably can come together, and that part of the thing can be taken care of. The question is, do you want it done or don't you? As the health officer of the town of Waterford, I do. They are going to put a canal through there, and they are going to bring in a lot of Italians and foreigners, and we are going to have some trouble with them. I am doing all I can to control it. I believe that if the children of the schools were vaccinated, it would help, but I have a passive board of education; not only passive, but opposed to it, and I want to know what can be done in the matter? If the law is not to be enforced, well and good, but let the responsibility go onto the shoulders of the board. I am here especially to-day to seek information as to how to enforce that law, and to find out whether it should be enforced or not.

Mr. Church—Doctor, I have pointed out that those two parts of the law were apparently inconsistent,—the part which says that the thing must be done and then in the next breath says the board may do it. I think that you are in a position to render a great service to all these health officers here by instituting a mandamus proceeding and getting a decision of the courts right on that proposition.

Delegate—I am getting a lot of blame up there now. I am standing a lot of it. I am the man that wants to enforce it. "We don't want Willie vaccinated." I am the man that is getting it. I have suggested methods of procedure which are satisfactory to a great majority, but there are a few men there who are opposed to it.

As regards my starting a mandamus proceeding for the closing of the schools or compelling this, I would be glad to, but I am getting this on my shoulders all the time now, and I want to know whether the State Department of Education and the State Department of Health want the law enforced. I will be of all the assistance in the matter that I can, but I believe that it is their duty rather than mine to put any mandamus up to the board of education there.

Dr. Miller—Can the State Department of Education remove these trustees if they do not carry out the law; can it remove them from office?

Mr. Church—I am sorry that Commissioner Draper is not here. This is getting into deep water, outside of the vaccination question; but as I recollect offhand (perhaps Mr. Wood is more familiar with it than I am) they have a general power of removal of school trustees, and it is possible that it might be solved in that way; but whether they would be justified in doing that where the officer is acting in good faith would be another question.

Dr. Lewis—Let me suggest that Mr. Church is going to come here tomorrow with an answer to such questions as Dr. Miller's, after he has had time to look up authorities. So if any of you wish to ask questions of that kind, leave them here, and we will have a little experience meeting tomorrow.

Dr. Peck (of Oneonta)—Perhaps I can say what I want to, rather than to put in a question. The board of trustees of the village of Oneonta directed me to ascertain if possible if there

was any way in which they could compel the trustees of our union school district to carry out the law, the provisions of which seem to be very plain.

Occasionally we have a case of smallpox in Oneonta, and have been having them for the last ten years, now and then a case. The health officer appears before the board of education and urges them to have their children vaccinated or to enforce this law. We are in the same trouble as my friend from Waterford. We want to know just where the responsibility lies. The board of trustees don't believe in this personally. They don't know why they don't believe in it perhaps, but that is neither here nor there. They are urged by me to have their children vaccinated. They urge the superintendent of schools to urge the principals of the schools to urge upon the children to urge upon their parents to have them vaccinated; and there are very few, very few that are vaccinated.

Now the question is, and in the event of an epidemic there, who is to blame? Is the board of health to blame? Have we done our whole duty? Will we be censured and ought we to be censured? That is just what we want to know. Can we do anything or simply let it drift?

A Delegate—Last year our schools were closed by the board of education for four or five weeks. Our board believes in this law of vaccination, but they ran up against that idea where doctors give certificates to families that the children are not strong enough to be vaccinated. Now if that is lawful, would it not be a wise plan to make them get certificates from two or three doctors, because sometimes a doctor will give a certificate where he is afraid that if he does not give the certificate he may lose that man.

Dr. Peck—I don't know what the law is about that, but I don't think any physician should be allowed to give a certificate of that kind except the health officer. He is the only responsible physician in the town or village. He is the man to whom the public look for protection. He is supposed not to be influenced by the dollar,—that is from the parent of the child. That is my opinion. I don't know what the law is.

Dr. Lewis—Why not exclude them until they are vaccinated, altogether, and not pay any attention to a certificate? It is easy

enough to get a certificate at any place that I ever saw. It may be different in Lockport. Is there any further discussion?

A Delegate—I would like to ask a question as to the matter of jurisdiction. Where the position of health officer holds in a single individual in both village and town, whether if there occurs an epidemic in the village and the provisions of vaccination obtain there, whether he shall carry the same into the jurisdiction of the township, particularly as it would be where I reside, where the township is about four or five miles square and the village corporation limits is about two miles square,—approximately that?

Mr. Church—Doctor, it seems to me that you are two separate individuals, as it were. You are the town health officer and village health officer. Any authority conferred upon you by your board of health or school authorities of the village certainly would have no effect outside of the village limits, and your town board or school authorities would have to stand back of you to give you authority to act in the town outside the village, just the same as if you were two separate individuals acting.

Delegate—Much has been said in reference to the area to be covered by the health officer, where it is in such small townships, where the corporate limits of the village take out a large portion of the center of the township, whether the contagion would extend into the township districts, whereby it would become necessary for the town health officer to perform his duties there, or whether the political division or corporate limits and township limits would excuse the township health officer from paying any attention to anything that occurred in the village?

Mr. Church—Your idea is that the area of contagion spreading out, possibly the jurisdiction would extend. It seems to me that it would be largely a matter of discretion on the part of the officer. If the epidemic or threatened epidemic was so severe and the danger was so great that it would be impossible to get the authority of the village board and the town board too, he would probably be justified in extending his jurisdiction. But in all common cases I should say that he should get the authorities, both boards, to stand back of him. The health officer is simply the executive officer of the board of health.

Delegate—The point I wished to bring out was whether it

was obligatory or necessary for the health officer to take cognizance of the fact that the village board was up against him.

Mr. Church—I don't just get your idea.

Delegate—I mean to say that while the epidemic is inside the corporate limits of the village and the village board is attending to its duties, whether it becomes necessary, in the limited area of territory and the extent of the contagion, that the town board of health is obliged also to take notice of this contagion and act in the village district, in the matter of vaccination I am referring to.

Mr. Church—It seems to me that would depend on your facts. If the facts are such that there is smallpox in the town, around the village, and danger of its spreading, it seems to me it would be the duty of the town board, just as much in that case as in any other case, to take notice of it, and go ahead and act.

Dr. Sanborn (of Niagara)—I would like to ask the Attorney General one question: About a year ago now an epidemic of smallpox broke out in the adjoining town of Cambria from Lewiston, east. In that town is the village of Pekin, and in the town of Lewiston also. I learned that there was to be a Christmas tree in one of the churches at Pekin and that there was to be a dance at the hotel on Christmas Eve also, and that the people from my own country would go to the Christmas tree and also to the dance, some of them. The epidemic had broken out,—a tramp had stopped at this hotel two nights before and went down to a farmer's and engaged labor there. The result was that I ordered the church to shut up their Christmas tree business and social and the hotel to close on that dance. The result was I had the religious people and I had the dance people of the town on top of my ears, because I was in another town,—that I assumed certain things because the health officer of that town resided seven miles outside and when he was called to this case of smallpox he went and looked in the window very carefully and said, "That is smallpox undoubtedly." And they have had a great time there. Two or three of them have died in that vicinity down there.

The result of this course was that I had the people on my shoulders, that I had no business in the adjoining town to shut off that Christmas tree and the dance, but when I did it I did

it for the benefit of what I believed was the best interests of the public health.

A word on compulsory vaccination. I have had some correspondence with the Honorable Mr. Draper and also with the Honorable Commissioner Lewis. When that epidemic broke out there I ordered the vaccination of all the people that were unvaccinated in the town and village of Lewiston. They did not vaccinate. I went down into District 5, an exposed place, and I said, "I am here to vaccinate you." They did not want to be vaccinated. "Ma don't want I should be vaccinated." "All right; you will have to be vaccinated before you are going to attend this school." "Oh no." "Yes you are." And I vaccinated fourteen there, and I had the Christian Temperance Union and the Christian Scientists on top of my head again. But I want to say that I did that because I believed it was right. The board of health of my town and village said, "You are putting your foot in it too much. What do you want to vaccinate these people for?" "Because I believe it is a menace to the public health if they are unvaccinated." I have been threatened with several suits, but they have not sued. Commissioner Greene of the city of Buffalo has that city in his bailiwick, and he knows that they have a tombstone in the Forest Lawn cemetery, protesting against vaccination in the city of Buffalo. Am I right, Doctor?

Dr. Greene—Yes sir, it is worse than that.

Dr. McClelland—We have in our union school district five towns and hence five health officers outside of my jurisdiction, and children from all parts of the district come to our school in the village of Saranac Lake. What is the limit of my jurisdiction?

Dr. Greene—I am very much pleased to find that the questions are fired at the counsellor so rapidly, because it is so rarely that we get a chance to get any advice from an attorney gratis. I think we are making the best of it

Delegate—I have never run up against it as hard as my friend, either directly nor in a very small measure in regard to the vaccination of school children, but living back in the country and only meeting a brother physician occasionally, I would like to suggest this,—that there be a law so framed at the next ses-

sion that physicians may understand more about this vaccination question, for it has been such an unsettled question,—what we are to do and how to act, as health officers? Is it not a good scheme to have the law amended in some way so that health officers may understand a little more about what to do and go ahead and do it when smallpox may visit our communities?

Dr. Halstead—I would like to know what vaccination is. I ask the question because children have been admitted to the schools, through some other physician, who have been in the habit of giving them this by taking some medicine internally. Is that vaccination?

Mr. Church—The question is more or less a difficult one, and it is hardly to be called a strictly legal one; but I think you can safely assert that no medicine taken internally would vaccinate a person.

Dr. Halstead—I asked it because these children were immediately admitted to the school after taking this medicine. Should that be so? Is that a legal vaccination?

Mr. Church—Most certainly not. As I understand it, it is inoculation with the virus that is the vaccination. The medical men here can testify to that better than I can.

Dr. Lewis—Unless there is absolute evidence of their having been inoculated we do not consider them as having been vaccinated. Vaccination is not the act of scratching the skin, but it is the effect of an inoculation with vaccine virus.

Dr. Nichols—Mr. Commissioner, this section 210 speaks of public schools. What I would like to ask is this: Can we consider that all schools that receive a portion of the public money from the State are public schools and treat them as such, for instance parochial schools. Many of the parochial schools receive public moneys as I understand. Do they come under this law?

Mr. Church—Parochial schools are not generally under the supervision of the public authorities. Therefore I am of the opinion that they do not come under the general term public schools.

Dr. Nichols—I presume so, but nevertheless they receive public moneys.

Dr. Lewis—It is nearly time, I suppose, that we should adjourn for dinner. I would like to say right here that if we all had

the same amount of backbone that the health officer from Lewiston has, there would be a great deal less trouble with this question of vaccination of school children. (Great applause.) I have never yet seen (maybe I have said this here before) one of my patients (and I did practice medicine, you know, and saw a great many patients) who refused to be vaccinated for any length of time. I don't believe there is a person that I ever saw born or attended afterwards that had not been vaccinated, that is unvaccinated to-day. How it was brought about I don't know except that you can accomplish almost anything of that kind if you put the pressure on and keep it there long enough. I may be mistaken, but I believe that I could go into a parochial school and in the course of a season vaccinate every pupil in it. I could not if I went in bristling, with my elbows out and said, "I am going to vaccinate parochial schools whether you are public school children or not." That would not be the way I would do it. I think that if we incorporated, among other things, the word "diplomacy" in our duties as health officers, we could succeed sometimes where we now fail. The Doctor shakes his head and says he don't think diplomacy is the thing in sanitary work; but I think there is a place for diplomacy even in carrying out the provisions of the Public Health Law.

Dr. Moon (of Cooperstown)—I am placed in the position of being a member of the board of education also; so I am in a double position.

Dr. Peck—Excuse me for getting up once more. When you have smallpox break out, you haven't a great deal of time for diplomacy. You have got to jump in and do your work.

Dr. Lewis—That is what Dr. Sanborn did.

Dr. Peck—He was liable for it.

Dr. Lewis—He was not sued.

Dr. Peck—I had a good many people in a silk mill there one time. I used diplomacy in a way,—I gave them such a time to be vaccinated or quarantined. They had all been exposed and I could have quarantined those people.

Dr. Lewis—Suits against health officers don't make much headway. During the last few months a suit was brought in a Hudson river town where the health officer quarantined a hotel and there was no case of smallpox in it. There had been a case but

he escaped before the quarantine was instituted. The people having been exposed, the health officer shut up the house for two or three weeks and the proprietor sued him for damages. Now if there was ever a case where a prosecution had some ground for it, that might be one, I should think. He was closing up the house and the man's business when there was no disease there, and if he had gone in and fumigated perhaps and vaccinated the people who were there, it would have been perfectly safe. An old inspector of contagious diseases from the New York City Board of Health came up and swore that his action was entirely unwarranted and that he had no right under those circumstances to close up that hotel. Of course he was a star witness on the other side against the health officer. I happened to hear of it and volunteered to go up to White Plains and attend the trial, and I was up there a couple of days and heard all the testimony. When I was put on the stand, I said that the Doctor was governed by the state of the public mind, and must be to some extent in the provisions which he would institute for their protection; that what would satisfy the community and the public in New York city would not do in a little village. Smallpox is a serious thing in a small community, and certainly his measures were effective, and I believe that he was justified in doing that. There was a health officer of New York city saying that it was entirely unnecessary and unjustifiable and not the practice of any health board that he knew of throughout the country.

However the judge threw the case out and it never went to the jury, and that is a very common result of suits brought against health officers for trying to protect the public health. If you protect it too well, you don't do any harm. The harm comes the other way.

Delegate—If there were germs floating through the air he didn't protect it too well. Why was it not necessary for the germs to come down? It was necessary to quarantine a hotel of that kind under those circumstances.

Dr. Lewis—I believe so, Doctor, but the New York city authorities don't act that way.

Dr. Todd—What is the opinion of Mr. Church in reference to that thing? That same health officer has requested me to request

the Deputy Attorney General to inform us whether he had the right to close that hotel for two weeks.

Mr. Church—What were the facts?

Dr. Lewis—The facts were that a person was taken down with smallpox in this hotel and before the health officer arrived to quarantine he escaped and went down to Yonkers and then the health officer vaccinated the family and kept the house closed for two weeks, lest some of them might have contracted the disease from this man.

Mr. Church—That is more a question of medicine and fact than it is a question of law, I should say, as to how far the disease germs could have been disposed of in any other way, by fumigation, etc.; but I believe with Dr. Lewis that where you have got the sentiment of the public back of you it may be sometimes necessary for some of you to go a little bit outside the strict letter of the law, and that the public is very apt to uphold you where you act in good faith.

Delegate—Would fumigation like that have any effect after the person had been gone a couple of days? I am assuming that there was some person who was infected.

Dr. Lewis—It would have been an added protection.

Delegate—But would that have been likely after two or three days had elapsed?

Dr. Lewis—It is pretty hard to tell.

Delegate—If a person came in contact with the person for five minutes and inhaled the germs,—it seems to me he was perfectly justified in closing the house for the length of time he did.

Dr. Peck—It seems to me that he should have set that house at liberty as soon as possible. As soon as he found the bird had flown he should have fumigated that house and vaccinated the people, and those that were vaccinated he should have had report to him every day during the period of incubation. He had no business to keep that house quarantined two weeks. He ought to have got through the whole job in three days.

Delegate—A man died of smallpox. Four or five days before he died he was at a church card party of four or five hundred people. He was then in the papular stage, well on towards the

vesicular stage. If I had found him there, should I have shut up that church for three weeks?

Dr. Lewis—You might have shut it up for holding a card party.

Delegate—They should simply vaccinate them and keep them under espionage.

Dr. Todd—But this was a hotel which people frequented from all around the neighborhood for drinks and meals and so on, and this man had been walking around up stairs and down, and it was a little different.

Delegate—It was safe when he had disinfected it.

Dr. Codding (of New Rochelle)—I have just had a case that I think bears out your contention in regard to this hotel. I have under my jurisdiction Fort Slocum where there are five hundred soldiers. They had a case of varioloid a few weeks ago. I quarantined that island for three weeks and kept every soldier on that island. It was not that I was afraid they were going to bring smallpox into New Rochelle, but I knew that the people of New Rochelle knew there was smallpox on David's Island, and if they saw these soldiers floating around the streets everybody would have it in mind, it would be in the public mind, and for the public peace of mind I quarantined that Island, and I believe he quarantined that hotel for the same reason.

Dr. Lewis—I regard it as largely sentimental, but at the same time in a little town I believe it was necessary. There will be other opportunities this evening and to-morrow to take up smallpox again no doubt, especially this evening.

We now stand adjourned until eight o'clock.

EVENING SESSION, THURSDAY, DECEMBER 15, 1904.

Dr. Lewis—We will first have the pleasure of listening to Dr. Pearce, Director of the Bender Laboratory, on

PATHOGENIC PROTOZOA

(Dr. Pearce's illustrated lecture was not taken stenographically.)

Dr. Lewis—This very interesting demonstration by Dr. Pearce is open for discussion. I am not going to discuss it, because I don't know enough about the subject. I expect Dr. Pease to discuss this subject.

Dr. Pease:

LADIES AND GENTLEMEN—It is a total surprise to me to hear that I was expected to discuss Dr. Pearce's demonstration; and all I can say is that it is extremely interesting, and seems to me a very valuable thing for the members of the profession to keep in touch with the newer work which is being done on the relation of animal parasites to contagious or infectious diseases; and I for one feel very greatful to Dr. Pearce for giving us this demonstration tonight, and I think I can assure him that the members of the conference are also very grateful to him for the talk which he has given us.

Dr. Lewis—The conference would like to hear Dr. Vander Veer, on this or any other subject.

Dr. Vander Veer—Mr. Commissioner, I think that is somewhat severe,—"This or any other subject." I think it will be this subject. I was very much impressed with the first slide, the amoeba. In 1871 I spent quite a little time studying this little individual. That is not so very long ago; but Dr. Kline, of London, gave us at that time a very delightful course of instruction, extending through a course of three months, on the subject, on his efforts in discovering the microbe or germ of typhoid fever; and he felt that he had demonstrated it to a certainty from his experiments that he was then making upon the monkey; and I call to mind very distinctly the earnest work that he did at that time. He presented a number of microscopic slides in which he was certain that he had the true organism of typhoid fever, and he published a paper upon it. But, within a short time after that, he withdrew all of his conclusions, and that he had not succeeded in discovering the germ of typhoid fever.

That was thirty-four years ago, and when I consider the progress which has been made up to the present time,—I could transfer it to the subject of surgery, and say something about

germs in that direction,—I only want to say this: That I have been greatly instructed by listening to Dr. Pearce's excellent lecture, in giving us this very fine classification and clear description of the protozoa, in which we are so much interested in many ways at the present time.

Dr. Vedder—I think it is best to go even beyond thirty-four years. I have an old volume by Beals, which was published nearly fifty years ago, in which he argued against bacteriology and said there was nothing in it, because what are called protozoa now were the things that he had identified, and he represents formations of that general character in that book; and it is very interesting. The whole thing is very interesting because it is an anticipation of what is now coming to the front as something entirely new. Of course, he is dead and gone; but it is another illustration that there is nothing new under the sun. His idea was that protozoa were most important, and therefore that bacteriology could not be true. If you go back to the fifties, you will find a good many queer things.

Dr. Lewis—I called on Dr. Vander Veer for the purpose of having him express our appreciation of Dr. Pierce's paper, because I knew he could do it better than anybody else here. I thank you, Doctor, for expressing the thanks of the conference to Dr. Pearce.

We have provided for a discussion on the Differential Diagnosis of Smallpox, which Dr. Curtis will open.

Dr. F. C. Curtis, Professor of Dermatology, Albany Medical College, read the following paper on

DIFFERENTIAL DIAGNOSIS OF SMALLPOX

"The diagnosis of smallpox may be extraordinarily easy, or under certain circumstances very difficult, or even at times impossible."

This statement in Nothnaget expresses the experience of those who have to do with the matter. No one can mistake a well-marked case; irregular and undeveloped cases sometimes present difficulties which for a limited time are insurmountable; cases are seen which would be unrecognizable save for their surroundings.

What are the conspicuous features of typical variola? They may be enumerated as:

1. The variolous fever;
2. The morphology of the variolous pock;
3. The evolution of the pock, and
4. Its sites of preference.

The variolous fever is a marked feature to be taken into account in diagnosis; that is the fever of onset. The only noteworthy thing about it is, however, that it is fairly constant, fairly well marked, lasts three days and ends abruptly with the appearance of cutaneous lesions. It may be relied upon almost certainly as to its occurrence, duration and abrupt ending. It has no necessary characteristics other than these, and no others should be trusted or anticipated.

But these features of it can be relied on as certainly as any diagnostic symptom in any disease can be, and in the last of the three features it has no analogue in any other disease.

As to the morphology of the pock, there is first a small red macule, its redness well marked. It may not be noted except by careful study, for its duration as such is brief.

Within a few hours, or possibly within twenty-four, it becomes a papule in the center, that is, a little solid elevation. The papule increases, with the macule about it as a small areola which is soon lost, for there is no continuous halo of areola, as may be seen in varicella. It is early hard to the touch and this hardness continues in the consecutive evolutions of the pock.

The only exception to this fact is that it is often illy marked on the abdomen or where the skin is thin. Within twenty-four hours fluid will appear at the apex in typical variola. This vesicle broadens, it becomes flat, it is commonly firm to touch. The reason for this latter fact is that it is a chambered vesicle. Here, again, deviations may occur on the abdomen; so do not trust to the abdominal pock in diagnosis.

As to the evolution of the pock. In the course of two days from the commencement of pock formation, all these phases of of it may be found on the same subject. I know it is held to be a diagnostic sign between smallpox and chicken-pox that the eruption in the latter comes distinctively in crops. It does, and the

fact has diagnostic value, for this feature of it is very marked. But the fact I have stated regarding the evolution of the variolous pock should not be overlooked.

4. Sites of preference are manifested by all eruptive fevers. As commonly stated, the eruption in smallpox comes first, and most abundantly, on the face and hands. I will add that the palms generally have lesions on them, and very often the roof of the mouth; but the eruption of chicken-pox also comes on both these places.

Features of Irregular and Undeveloped Types.

1st. As to adherence of these to the typical. They can be counted on to adhere to all four of the points I have noted as conspicuous.

It is exceedingly rare to find a case of smallpox so mild but that the initial fever may be readily detected, lasting three days and ending abruptly with the appearance of the eruption.

The pock will develop at the start in much the same way; so far as it goes its evolution will be the same, and it will choose the regular sites.

2nd. As to departure from the typical. This will be in the direction of failure to develop fully; that is, the disease will abort. The initial fever may be the only fibrile action in the course of the disease. The lesions may not become vesicular, or only a few of them may, or at any rate they dry down in the vesicular stage and never become postular.

These mild cases then will be found to have the common initial fever, eruption of the same papulous type, but failure of their development beyond it. It is these cases with nondeveloping pock and no fever after that of onset which go undiscovered and unrecognized by the physician.

Diseases With Which Smallpox is Confounded.

I will only mention some which come to our notice.

Measles.—This disease has an initial fever of similar duration and eruption which at the beginning looks papular; but the fever increases rather than ends with the appearance of the eruption, and is always attended with coryza; the circumscribed blotches

of measles never have any suggestion of the hard papule which soon forms in smallpox.

Erythema Multoform.—This may have an irregular fever prior to eruption, but the dull colored blotches on the back of the hands can only a few of them have anything suggestive of the bright red macule of smallpox. In fact, I never knew of but one case where these diseases were confounded.

Imfetigo centaposia is a name frequently given to an outbreak of smallpox. While a disease of childhood, it, or what is practically it, is seen of late much upon the faces of adult men who contract it in barbershops. But the flat vesico-postules scattered over the face soon dry up to their yellow superficial crusts, and have almost nothing to suggest the pock of smallpox to anyone familiar with them.

Scabies.—The names of Cuban or other itch have been constantly given to mild variola. Perhaps the postules appearing on the hands and between the fingers sometimes suggest scabies; but scabies has always a history of itchiness, of prolonged and indefinite duration, without fever, and the eruption is multiform, is not seen on the face, and in fact has almost nothing about it resembling that of smallpox.

Acne has sometimes variolaform lesions on the face; but the history and concomitant lesions ought always to exclude it.

Postular Syphilide.—This may sometimes be indistinguishable from the pock of smallpox, and with an untrustworthy history in the case of a tramp one may have to wait for developments to make a diagnosis. A syphilitic person may take smallpox, but generally the concomitant symptoms of syphilis may be trusted.

Chicken-pox finally, is the disease most often confounded with smallpox. I will only repeat the points of distinction which we have so often given.

1. Age of subject.—Without doubt adults have chicken-pox, but it is so rare after the age of twenty-five that every suspected case should be held for development.

2. Fever.—Careful inquiry will show that the initial fever has occurred in smallpox, as already noted, and in chicken-pox it will be lacking. One should make very careful inquiry of this.

Barring the chance occurrence of fever or malaise prior to the developing of true chicken-pox from some extraneous cause, there need be no hesitation in trusting to the initial fever of three days in smallpox, ending abruptly when eruption comes, as diagnostic.

3. The lesion of smallpox is a *papule*.—The only confusion is that some lesions of chicken-pox by reason of trauma (?) possibly, may be congested so as to resemble a papule; they will lack the firm feel to touch. On the other hand, remember that on the abdomen the lesion of smallpox may have little papular quality. On the abdomen chicken-pox is vesicular from the very beginning, barring a transient macule sometimes found, and by the third day some lesions may be found which never develop beyond the macule.

4. *Crops of lesions.*—For three days lesions of all sizes and stages of development may be found in chicken-pox, and this is much more marked than in smallpox to which I have already referred.

5. *Site of lesion.*—The body is the chief site of eruption in chicken-pox; it begins there and is most abundant there, and is, more than any other part, on the shoulder blades part of the back. But it comes on the mucous surfaces and palms and soles just as in smallpox, but the contrasts of site are marked enough to help in diagnosis between the two diseases.

6. *Duration of the disease.*—By the fifth day the chicken-pox lesions will begin to dry up, some will soon scale off and nothing but a light stain will remain. In smallpox, although the vesicle may be ill-developed and soon dry up, the papular part of the lesion remains and often continues to be appreciable for more than three weeks. One should never be misled by apparent subsidence of activity of lesion, failing to note this continued induration.

7. Vaccination is a final test. I believe that no one who has or has nearly had smallpox is susceptible to vaccination.

One has to count in all these elements secured by close observation, to make certain of a diagnosis.

We have so widely prevalent a mild, irregular type of smallpox that only considerate scrutiny suffices. Severe, fatal smallpox

may be taken from the mildest type of the disease, and this should stimulate us to careful and intelligent scrutiny of every suspected case of this disease.

Dr. Lewis—I would ask Dr. Sengstacken, of Stony Point, to continue the discussion.

Dr. Sengstacken:

MR. CHAIRMAN, AND LADIES AND GENTLEMEN: I don't know that there is very much that I can add to what Dr. Curtis has said, except to say that in chicken-pox the vesicles will always collapse if you puncture them. In smallpox they will not. The stage of invasion as you all know, in chicken-pox is two days before the eruption appears, and before the vesicle appears. In smallpox, you have a vesicle on the fifth day, then the vesicles until the ninth day, and then the pus. In chicken-pox, the vesicle is either round or oblong in shape. In smallpox it is always oval or round.

Down in Stony Point, as Dr. Curtis said, we have a number of negroes that come to us broken out with what they call the "bumps." In nearly every case we have been able to get the stage of invasion, and they have headache and backache which lasts four days, when the eruption comes on. The only trouble I find is in the point of time. You have the vesicular stage, the stage of invasion, four days, when some of them will have one or two postules which do not vesiculate, but dry up and disappear; and for the benefit of those here, I might give you the history of a family that I treated last spring. There was a mother, father and eight children, and I was called on the 10th of April and found the mother with a high fever, backache, headache and supposed she had the grip. While I was in the room I was told that one of the daughters that had grip was covered with sores. I saw the daughter and she was covered with postules. On the fourth day there were about a dozen papules on the mother's face and dried up and disappeared. The father was then taken sick, with the same symptoms,—four days fever, headache and backache, and he had two papules, one on the ear (?) and one on the breast, when they disappeared. Then a boy of ten was taken down, and he had a well developed case of smallpox. One little fellow of seven was sick four days, with a temperature of almost

104, with headache and backache; on the fourth day he had one papule on the forehead and one on the wrist, which dried up and disappeared in three or four days. Two of the other children escaped,—one of them a young man eighteen years of age, who was vaccinated the previous February, and a daughter that came home when the daughter was taken ill and was vaccinated as soon as she reached the house.

Out of thirty-three cases which I have had since April 10th, last, three were confluent, seven discreet, and ten of the abortive type. Seventeen out of the thirty-three had never been vaccinated.

That I believe is all I can tell you, except what has already been said.

Dr. Lewis—I wish you would all make a note of that last statement of the doctor's and take it home and present it to your boards of education.

Is Dr. Craig, the Albany health officer, present? I would like to have him continue the discussion.

In the meantime, Dr. Johnson, the Secretary of the Department, can fill up the time, if he will be so kind.

Dr. Johnson:

Mr. Commissioner, Ladies and Gentlemen—What I have to say upon this subject will be somewhat in the line of what Dr. Curtis has just stated to you, and in the line of experience.

As many of you here present are aware, I have had the pleasure of visiting your communities where smallpox has existed; and I desire to say that, oftentimes, it has not been discovered until I visited you, and oftentimes it has existed in communities for a period of three or four months before it was diagnosed as smallpox, and then I may say because of more or less anxiety on the part of relatives and friends who have thought it a very serious case,—the existing case of chicken-pox, Cuban itch, nigger itch, elephant itch, and other names that I cannot now recall. Doctor Curtis has told you in regard to the different symptoms presented in the different stages of the disease.

It is seldom that I have visited a municipality at the period of invasion or initial stage. It is generally during the eruptive stage; and I desire to say in this connection that, in visiting a

patient, there is a great deal to be observed by inspection. I think those of you who have had experience of this kind have often gone into a room, and the room is somewhat darkened, with but little light, the patient lying in bed, and you have not been able to make a diagnosis of the disease by the appearance of the eruption upon the patient.

I will cite measles. I think you will notice often those crescent shaped wheels upon the face, that congestion of the eyes, which will almost demonstrate to you what you have before you before you have gone further, and when the light is more brilliant you will be able to discover that it may be a case of measles.

Now, one of the first things that I generally do in a case of this kind, where an eruptive disease exists, and it is rather suspicious that smallpox may exist, is to discriminate as soon as I can whether it is vasiculo sequense disease or a papulo vesicular one, and I ordinarily wash my hands and pass my hands over the surface of the body, and soon can discriminate between the two.

As Doctor Curtis has said, in case it is smallpox you can't very well make a mistake in regard to the papular form of the lesions. Oftentimes they are so far advanced that they have aborted in the vesicular stage, and oftentimes you will find while that has existed upon the face and the hands and that portion of the body which is exposed, if you will go a little further in your examination, you will discover on the lower extremities lesions in the vesicular or changing to the postular stage.

Now, I generally make it a point to make a very close examination and sit down and talk with the patient. First, I try to discover the period of invasion,—the day that you were taken sick; what you were doing on that day; and I write it out. The physician in attendance is usually there, or the health officer. I find recurrent chills, headache, backache, pains in the loins, and sometimes nothing more observed than a cold, as the doctor has stated; and oftentimes again they say that they have an attack of grip.

If I can I try to get the temperature accurately, from the physician in attendance or the health officer. I have often found that many of those things are overlooked; that the physician in attendance does not get all the points that are presented, or

they may be given in such a loose way that his observations have not been very close, and after prescribing he has gone away with the idea that he will be called again in a few days, and he will leave some simple remedy probably, suitable to the case. But he is not called again in several days, and perhaps the next time he sees the patient, he is out in the street, well, and attending to his accustomed duties.

In a short time other cases will follow, and they come along with the chicken-pox, or whatever it may be called, for a period of a couple of weeks or three weeks, and it will finally get into the school; and it amounts to but very little until maybe the teacher comes down with it, and after he has had his experience with it for a few days,—oftentimes he does not find it necessary to suspend his duties as a teacher, he remains in the school and all the scholars are in attendance, and in a short time they have an epidemic of chicken-pox in that vicinity, and the Department is requested to send someone there, because they have a very bad case of chicken-pox and are suspicious that it may be smallpox.

When making such a visitation,—I have described to you here about how the first case was attended,—that it was overlooked; no particular attention was paid to it,—and when I go to make an examination perhaps in a family which has gone through three or four weeks of it, the statement that is made to me does not accord with the statement made to the attending physician, and he has overlooked it by reason of the statements made to him.

It often occurs that the cases are of such a very light character that I don't wonder that many suburban physicians, those in small municipalities, who have had very little experience in smallpox, should know nothing about it except what they have read upon the subject; and usually in those cases, if they are suspicious relative to them, they make reference to their works upon the subject, and examine the illustrations closely of typical cases, beautifully penciled, so that they can make no mistake in those cases which they make reference to, and will say to themselves: "This is not a case of smallpox. It does not look like any cases that I ever saw or that I read about." And in that way the cases are often overlooked.

Now, then, I may say that there is no mistake in regard to its being,-first, papular, then vesicular, and the postular. I have in mind a case where I was called to see a patient with a health officer, and there was no doubt about the diagnosis. In another family I visited with him, the case was so extremely light that really no one could say what was the matter from his description of the case, and I walked with him out upon the porch, and he said that the only thing the patient had upon his person was a little bit of a pimple on the palm of the hand, over the cushion part of the thumb, which is a very characteristic lesion of smallpox. It was the only one he had upon his person he said, although he thought he had had a few in his scalp.

Now, where such cases exist, of such a mild character, and the few lesions that are exhibited, and the period of invasion scarcely noticed by the patient, it is a very difficult matter for any man, for a physician who has had no experience, to make a diagnosis of smallpox.

I will go back and say that among those things that I give particular attention to is the period of invasion. As Dr. Curtis said, three days is ordinarily and generally the period presented of the invasion, although I have had persons say to me that it is four days, and I don't know but five (gone beyond the three days) but ordinarily it is but three days.

As I said before, as soon as vesiculation takes place, those lesions abort.

A very marked feature in most cases, I may say here, is lesions in the palmer surface of the hand, and the interdigital spaces; and sometimes they may be observed on the surface of the feet. Frequently they are of such a character and the induration is so related to the sub-adjacent tissue which is involved, that I have seen several persons with a jack-knife attempting to cut out their corns, which they have exhibited to me, which they thought were corns, but were simply the result of the lesion of smallpox.

I will not talk much about chicken-pox, which it is generally taken for, only to say this: That I think chicken-pox should be quarantined; generally speaking, if chicken-pox is quarantined, you will make no mistake about quarantining smallpox, for ordinarily I find that it is taken for chicken-pox, and that the

neighbors and friends and physicians, in mild cases, are very apt to make a diagnosis of chicken-pox.

I never saw but one case of chicken-pox in an adult. That I saw last week, and I must say that the period of invasion of course was of a very mild type, and he described quite clearly the period of invasion of smallpox, and yet there were only a very few lesions upon his body and they were so very light and filled with a light, limpid fluid, that when you touched them they broke and the fluid escaped.

Another thing I give special attention to, which is worthy of attention: After carefully taking down all the physical signs, I look at their arms. "Have you ever been vaccinated?" "Yes." "Let me see your arm." Very, very many times I find upon inspection of their arms, that there is no evidence of vaccination,—no scar whatever. I ask them more particularly about it. They were vaccinated, but they don't remember whether it took, or not. It is very evident that they have not been properly vaccinated. If the result was not satisfactory, it was not a successful vaccination.

I have very seldom seen a case of smallpox or varioloid,—I have not seen any that carries a scar that has been made in the past three years. I think it safe to say that any person who has a typical scar upon his arm which is the result of vaccination, within two or three years, will not have smallpox, and in a large majority of cases (I can say all the cases almost, that I have vaccinated) we don't find any person who has had smallpox, I may say, unless they haven't been vaccinated,—generally speaking, all those cases that have smallpox have not been vaccinated.

When that question comes up for discussion with other members of the family, for their protection, I am astonished to find the opposition there is to vaccination which is occasioned by some peculiar individuals in the community who are opposed to it, called anti-vaccinationists, who tell terrible stories about loss of arms and loss of life, and a great many other ill effects resulting from vaccination; and your Commissioner of Health of this State sent me, a couple of weeks ago, to the northern portion of this State where complaints were made to the De-

partment of the ill effects of vaccination; and I visited those people, and found there was, as usual, nothing in it.

Ordinarily, I think the bad arms which are the result of vaccination are due to other infection. There is no doubt but that that is the case.

Now, then, I will go along a little further in regard to what should be done with patients suffering from smallpox in a community. Health officers usually have a good deal of trouble,—it is a very difficult thing for them to get along with a community, by reason of the opposition they have to contend with. Some members of the board of health are opposed to vaccination,—they are opposed to a great many things suggested by the health officer; and I want to say that health officers generally understand their business. They may have overlooked a case, but they are capable of recognizing it after a short time, and also use every effort for its suppression.

One of the most important things is isolation, and you know, many of you, the difficulty that is attendant upon the isolation of patients in the suburban districts. You will have a family of six, eight or ten persons in a house. You can't isolate them very well,—not pleasantly at least. It is a difficult matter to get a place where you can care for them,—an isolation hospital or hospital of detention,—and as I said before, great difficulty exists. It cannot be controlled,—the important thing is to put them upstairs. Clean out the room, remove the fabrics. Have nothing but plain curtains and the most simple furniture that it is impossible to obtain; put but one person in their care, unless it is an aggravated case where that person must be relieved.

Ordinarily in the epidemics that we have throughout the State, they are generally of a mild form; so much so that it is a pretty hard matter for the people to become reconciled to the fact that smallpox exists, and that by isolation from other members of the family may exist in the same house only if they are kept away from them; but treat them by one person, that is nursing, and the physician should go there prepared for the purpose of protecting the community and vaccinating the rest of the family, if it is possible to do so, and at a certain period of time, to fumigate the premises thoroughly.

One of the most important things in connection with it is fumigation, and that fumigation should be conducted upon scientific principles. It should be very thorough, and if it is done thoroughly I think you can suppress the disease in a short time in that family, if those persons are vaccinated. If those persons who have not been vaccinated are vaccinated immediately, the physician will get ahead of the smallpox, and not another person be infected in that house.

Therefore, gentlemen, in regard to smallpox, which is a preventible disease, it may be suppressed in any community if proper care is taken and rigid means exercised for its suppression, by vaccination, fumigation and isolation. I think that will almost cover the ground.

I think that is all that is necessary for me to say upon the subject, in regard to the care of smallpox.

Dr. Lewis—Is there any further discussion of smallpox?

Dr. Mason (of Fishkill)—Dr. Johnson had just touched upon the question of vaccination. I would say just a word. This question of smallpox has already been pretty well threshed out this evening, particularly the part relating to the diagnosis of it. There is a general impression throughout the country among the laity that a person who has been vaccinated unsuccessfully many times is proof against the contagion of smallpox. I hold an enlarged photograph in my hand of a boy ten years old who had been vaccinated ten times without having it take a single time. He got smallpox from his grandmother who had died in his home, the case having been mistaken for a case of erysipelas, with this result. The other inmates of the house were all vaccinated upon the death of the old lady, as well as the boy himself. The other vaccinations took promptly. His delayed, and within the period of incubation he was taken sick and developed a most typical case.

To get back to the original paper for discussion this evening, of Dr. Curtis, and particularly upon the diagnostic features of smallpox, I want to indorse every word that he has said, as an experience of thirty years in the practice of medicine, twenty of which has been in health officer's work, including a number of cases of smallpox, has shown me that he is right.

I want to say that, as to the diagnostic differences between chicken-pox and smallpox, there are three points particularly to be depended upon. The first is the multilocular postule of smallpox, as compared with the single vesicle of chicken-pox. Second, the hardness of the smallpox fill as compared with the soft fill of the vesicle of chicken-pox, and third the appearance of smallpox lesions upon the palms of the hands or upon the soles of the feet, which never occurs in chicken-pox.

I have never seen a case of chicken-pox in an adult. We have, of course, many of these abortive cases of varioloid. We have had many of them down the river. It has been my duty to care for no less than six cases of smallpox at Croton Point, and I expect, although through no fault of my friend at Stony Point, that the cases escaped and came from across the river. In these cases of negroes, in the first stages of the eruption we have no aureole, no redness, because you can't tell it in the darker colored negroes, and the first thing you know the initial fever has begun and passed through its stages, and the fifth day probably the negro says he has got the "bumps." I had six cases in a camp at Croton Point. The original case was discovered upon the brick yards,—a man who was at work handling the same piles that the other colored workmen handled. He had been sick some ten days previously with what was supposed to be chills and fever, for which he had been treated by the local physician. The original fever had subsided, but the postular fever drove him to his bed and brought the case to the surface. Previous to that time he had been in the village of Croton and had played cards in the saloon with other colored men and went back to Croton Point to the brick yard, and was discovered, put in camp, and five other cases in the same locality followed each other successively.

Now, the peculiar feature: The abortive type or very mild form of varioloid that has developed in the village of Croton since the original negro, can be traced directly from him down to the present day, and in that village today there exist six or eight cases of varioloid of a mild type and two severe cases of smallpox, which have been sent to the pest house outside of the village.

From the day that the negro played cards, on Saturday night before the Monday on which his case was discovered, the different people who contracted the contagion can be successively followed, right down to the present day.

Many cases of varioloid have been mistaken for chicken-pox. Many of these cases in the village of Croton were mistaken for chicken-pox, and one or two developed severe symptoms, and the people themselves were frightened, because the children, half-grown children, were so sick. It was not the mistake of the physician, but of the families themselves; they had supposed that they had chicken-pox, until the postular fever made its appearance. Then they were so sick that they had to go to bed, and then the physician was called in and the true state of affairs was discovered.

The few cases which exist there now are well under control, through the efforts of Dr. Miller, the health officer of the village of Croton. I have had the pleasure of assisting him in as many ways as I can, and have taken care of the severe cases, which have been removed outside the village but within the town limits, to the pest house. I thank you.

Dr. Goler, of Rochester:

MR. CHAIRMAN—I feel that I know a great deal less about smallpox than I did some years ago. That is after an experience with some eight hundred cases and making diagnoses in some one or two thousand cases.

I think that we all owe Dr. Curtis our sincere thanks for what he has so clearly placed before us, and I do not think I can add very much to what he has so clearly set forth; but there are one or two things that occurred to me in this discussion that I certainly think ought to be cleared up, in the light of my own practical experience.

One thing is that the eruption of chicken-pox does not appear upon the palms of the hands. I think it does occasionally occur upon the palmer surface of the hands although it is very rare indeed.

The other is the difficulty of making the diagnosis sometimes between syphilis (?) and smallpox. I think the case that Dr. Curtis referred to was a Rochester case, and that case perhaps deserves

a word or two of comment, because it was rather a remarkable case.

A man who came to the city had been going around the country a good deal and he was accompanied by a woman who traveled with him. The man had been sick for a few days, two or three days, I think, with the initial fever. He had a papular eruption upon his body, and the woman who accompanied him had a similar attack of fever and a very similar papular eruption upon her body. Those were the two points that made the diagnosis in these cases rather difficult and they were, I think, the only cases out of a great number of cases that were under a cloud for more than twenty-four hours, perhaps.

I don't believe that it is very difficult to make the diagnosis in ordinary cases of smallpox, but in those abortive forms when but one or two postules or papules occur, and those postules do not go on the papulation, I think those cases, especially to men who have not had a wide experience in the diagnosis of smallpox, are very difficult of diagnosis indeed.

Dr. Peck—I feel that I ought to say a few words. Of course, almost anyone can diagnose a typical or well-marked case of chicken-pox. That is not where the difficulty comes in; it is in the obscure cases.

The health officer runs up against a case long after the initial fever very likely, and in many cases you cannot get any history of the fever whatever, but you have got an eruption that is wonderfully like the smallpox eruption. Perhaps these people have had no physician, or they may have had. I think that, in almost all cases, and perhaps in every case, there is a fever of a few days perhaps; but you can't get the history of it. Where you have these abortive eruptions, it is very, very difficult, and no physician I think ought to be blamed, in many of these cases, for not making a correct diagnosis.

There is one thing which has not been dwelt upon very much, that I think a great deal of, and that is the halo surrounding the postule, if it goes as far as the postular stage. For about two days the halo will be very bright and very distinct. I have seen, I think, in a case of chicken-pox, something that is very like a halo, but it is pale, and not characteristic at all of it.

Now we come to the age. Of course, chicken-pox is very rare in adults, but I know that they do have it. I have seen several cases of my own, of people over thirty years of age.

A case came to my knowledge within the last three months, of a woman, a mother of a family, thirty years of age and more, and I was unable to say for a long time whether she had chicken-pox or smallpox. She had a physician but once, and he reported the case to me, and I quarantined the family, because I was in doubt. I think that is the proper way to do. She had some eruption on her face and some eruption on her body, and some eruption on her limbs, and I was very suspicious of the case; but it happened that there were two girls, one of eight and the other of ten, in the family. One had been vaccinated and the other had not,—the other had had chicken-pox, but had not been vaccinated. The girl who had never had chicken-pox, in the course of fifteen or twenty days came down with the chicken-pox, and the other girl did not have smallpox, so I concluded it was chicken-pox.

It is sometimes very difficult, too, to distinguish a case from measles. A case occurred with us a year ago in which a man forty years of age had a high fever, a temperature of 104 or 105, for two or three days, and it was reported as a case of smallpox; but in three or four days the man came out with measles in good shape. We had him quarantined all right; so it was not very bad after all.

Another case in my experience,—I don't want to take up too much time, but to show how very difficult it is sometimes to make a diagnosis, and how, many times, no diagnosis is made until it is too late, and perhaps not at all,—a year ago we had a little smallpox in our place, and two boys in a family had been vaccinated,—in fact the whole family, consisting of two boys and three girls, were vaccinated by myself several years ago. They are grown now. With the girls the vaccination was successful, but with the boys it was not. The two boys both had smallpox and the girls escaped.

I saw a case last spring, where a woman was about the house with well-marked smallpox, not sick at all. She had had fever for a few days, but she said her husband had been sick the same as she, except a great deal worse. I found the man at church,

and he was cleaned up and washed up in good shape, and I brought him home. It seems that a couple of weeks before, he had not been feeling well, and being in the grocery store, where they had patent medicines (which is good for smallpox, as well as everything else) he began taking this medicine for his blood, wihch was out of order, as he supposed, and it proved to be wonderfully good medicine, because it drove out the eruption thoroughly; and people came to the store and asked him what the matter was, and he said he was taking this wonderful blood medicine; and they all congratulated him upon the result,—how this medicine had brought out a fearful eruption, and they thought it was a good thing. Of course, when his wife commenced to have the symptoms, it was the same medicine, and it brought it out on two of the children, although the children did not take it,—but the medicine was so good that it brought out the eruption all right.

So there are many funny things about some of these smallpox cases. I could talk a great deal longer, but that is probably enough; but I want to say right here that there has been a great deal of literature published on this smallpox question, but one of the best articles that I have read on smallpox and one of the best lessons taught on it, is an article by Doctor Vander Veer, published in the Albany Evening Journal a few years ago. I hope Dr Vander Veer will tell us about it.

Delegate—There is one suggestion that I would make in reference to quarantine: Put a wire fence right around the premises, and then it is quarantined, with the understanding that you can go on the back stoop and talk, and all that sort of thing.

Delegate—Will an eruption of smallpox occur on the mucuous membrane of the mouth?

Dr. Lewis—Dr. Hix, you can answer that question.

Dr. Hix:

Mr. Chairman—I am not here to answer any questions. I wish I was able to, but I do not feel able to discuss the subject, after it has been so ably discussed by men of such wide experience, and I have only a limited experience; but I have one question to ask: We have been taught in regard to protozoa of

smallpox, etc., and then we have been taught that there are many cases of abortive smallpox, abortive in the vesicular and papular state;; and I would like to ask Dr. Curtis and Dr. Johnson and the other gentlemen, how much contagion there is in this abortive period,—if they can tell us whether this protozoa has been formed in those cases.

Dr. Curtis—When Dr. Hix uses words of so many syllables, I have to say that I don't know; I think that is about it, though.

The type of smallpox we have now generally runs true; it won't always do it, for I have seen hemorrhagic smallpox without the slightest expression of the disease; but I think it can generally be anticipated that like will produce like; and I am sure that it is not very infectious. When you take your family, who have never seen a doctor and have gone about the village, and all of them have had smallpox, and very little comes of it, it cannot be that it is so very infectious.

There is a good deal more fuss made over smallpox than there ought to be. There are a great many worse things than that; and as to the distance that it may go, I am very certain that the tendency of feeling now is that the distance at which it is infective is very much less than was formerly thought to be true.

Someone has asked about the mucuous surface being affected. Lesions in the majority of cases will occur in the roof of the mouth in smallpox and in a marked case of chicken-pox as well, and on the mucuous surface elsewhere than on the mouth you will find them. I don't think that there is any reliance to be placed upon the occurrence as characteristic of either one. There is more reliance to be placed upon the occurrence of the lesion upon the palm of the hand, but that will also sometimes be the seat of lesions in chicken-pox, in my experience. All I can say is that it does not occur centrally; that is as far as I have been able to go, the center of the hand escapes in chicken-pox.

I would like to ask, Mr. Commissioner,—it is seldom that we get a body of people together that know so much about smallpox as is gathered here; and every one has experiences,—I would like to ask if anyone has anything to contribute on the question of the taking of the vaccination sequent to a recent case of smallpox.

Dr. Goler, have you ever tried the vaccinating of anyone after his having had smallpox?

Dr. Goler—Yes.

Dr. Curtis—With what result?

Dr. Goler—Within a short time.

Dr. Curtis—Yes.

Dr. Goler—I have vaccinated cases with smallpox,——

Dr. Curtis—I mean did they take the vaccine after having had varioloid.

Dr. Goler—They might not; I think they did not.

Dr. Curtis—Because it is used sometimes as a test. Dr. Hyde, of Chicago, says that it is not a reliable test; but my experience is that they don't see cases through. I have asked health officers to try it, and I know vaccination has taken after some cases that we determined were chicken-pox. I have not found it taking after those that really were smallpox; and there is no authority for making the opposite statement.

Delegate—I would like to ask Dr. Curtis if the secondary fever has any special significance with reference to the diagnosis. I have heard nothing about the secondary fever which occurs about the end of the first week. In the old cases, we used to read about that considerably.

Dr. Curtis—Yes, I ought to have spoken of that thing in speaking of the variolus fever; but that does not occur in abortive smallpox. I mean by that smallpox that simply reaches the stage of vesiculation, and then the lesion drys up. The secondary fever is simply a pus fever. It won't occur unless postulation takes place, and while it may be to some extent an essential fever, still it is, to a large degree at least, a suppurative fever, and is not to be looked for in these mild cases that we see.

A Delegate—I would like to ask why smallpox appears in the cases of those who were not vaccinated.

Dr. Curtis—Well, I don't know, except it is made that way. We had, two or three years ago, in Albany, forty little children in an orphanage, and all of them excepting one, who had for-

tunately been vaccinated, had variola. Most of them had it very lightly. There was one little thing, just big enough to creep around that never was sick enough to quit its play, never took to bed. The initial fever was, in other words, almost nothing, and it had three or four little bright papules which did not even vesiculate. It had never been vaccinated, it was a baby, and it was a good case for true variola to occur if it was going to, but it did not. It was simply because the type that it had been exposed to was of that mild sort that it would not.

Dr. Clarke—Is it not possible that there is hereditary immunity from smallpox; that the generation back of us having been vaccinated so many years that the progeny in that way carries immunity with it?

A Delegate—I would like to ask Dr. Curtis in what stage of the smallpox contagion begins.

Dr. Curtis—One of the most interesting lecturers that I ever heard in the early days was Dr. Alonzo Clark. I don't know whether he ever saw a case of smallpox; but he is my authority for saying (and I have sort of preached it ever since) that smallpox is very little contagious until the fourth day of eruption, or something like that. How is that, Mr. Commissioner?

Dr. Lewis—I think that is perfectly true. I have heard Professor Clark say so, I think.

Dr. Curtis—The text books claim its contagiousness, and I see no reason why it should not be, from the beginning of the first manifestation of the disease, but it does not seem to be very much so until the eruption has arrived at the point where it is diagnosable.

Dr. Miller—I have found one thing in my experience with smallpox that the initial fever of smallpox has nothing to do with the amount of eruption, its abortiveness, or anything of that kind. In some cases where the vesicles have aborted in two or three days, the initial symptoms have been just as severe as in the severest case of smallpox I ever saw.

Dr. Crum—How long should these mild cases be held in quarantine?

Dr. Curtis—Three weeks.

Dr. Crum—In a mild case of smallpox, how long shall we keep these people isolated?

Dr. Curtis—Never less than three weeks.

Dr. Lewis—Doctor Curtis is whispering to me "never less than three weeks." If I were going to answer it, I would say to quarantine until there is no evidence of a skin lesion that is liable to communicate contagion. In other words, if I were quarantining a case, and the eruptions were completely healed, and the patient was well, I would let him go, even if it were less than three weeks.

Dr. Crum—I know that is the rule, to keep them quarantined until every vestige of the eruption is gone. But in these mild cases, where you can not find any evidences of eruption in ten days, as I saw one case, it seems to me hard to keep them under quarantine.

Dr. Lewis—There is some possibility that the mucous surface might communicate contagion in as short a time as that.

I think Dr. Lord wanted to defend the reputation of Haverstraw.

Dr. Lord—There has been so much said about smallpox that there is nothing left to be said from my standpoint. The health officer sometimes has to satisfy the neighbors who insist upon it that a person has smallpox when they have a buckwheat cake rash.

I have seen about all the cases of smallpox in our community within the last fourteen or fifteen years, and I have only seen a very few that have been abortive. Two occurred three summers ago. I was called in to see a patient by the physician,—the man had chills and fever and his wife the measles. I told him I thought it was smallpox, and a couple of days afterwards the man died,—on the 15th day.

The abortive cases are interesting to assist the health officer or physician in making diagnosis. I had one case last year in which Dr. Curtis was interested. It was a negro and he had a rash across his nose; I claimed he had smallpox. He was working and his employer objected to having him quarantined,

but I did it. Dr. Curtis came down and saw it,—he probably remembers the case. About eight days afterwards the man was taken down with confluent smallpox, and from him directly came eight cases, in the same house, all relatives. This man of whom I speak, with only a little rash across his nose, was able to work and was working in a brick yard.

I don't know of anything else to say.

Dr. Lewis—For what period do you quarantine smallpox?

Dr. Lord—I quarantine them until I am absolutely certain that their skin is clean, absolutely. Forty-two days if necessary. I have let them go as low as twenty-seven.

Dr. Lewis—Did you ever raise the quarantine in two weeks?

Dr. Lord—Not if I quarantine them for smallpox.

Dr. Lewis—That is what I mean.

Dr. Lord—No.

Dr. Forster—I wish to say that, in 1862, I thought I knew what smallpox was; and the longer I live the more I am satisfied that Dr. Johnson was correct when he said that it was somewhat difficult sometimes, to know whether you had a case of smallpox. Dr. Johnson will likely call to mind coming down to my section of the country to tell me that we had smallpox. On the occasion of his visit, I was assisting in helping to perform a marriage ceremony with one of the prime (?) cases, and the gentleman had come in direct contact with sixty or seventy-five people. Neither the wife that he married nor any other person outside of his father contracted the disease from him.

They had some twenty cases in the two towns that I have the misfortune to represent, and the only misfortune in connection with the matter is that there didn't everybody have smallpox. There was not anybody sick,—Dr. Johnson remembers it.

That is all I have got to say,—if I should live ten years more, I would not know anything about it.

A Delegate—I have a question to ask; and that is what is meant by isolation,—twenty feet away from other people, half a mile, or what distance. What must we do,—put them up at the top of the house?

Dr. Lewis—You might do that.

Delegate—If you are in a village, and have no pest house?

Dr. Lewis—Yes, sir.

Delegate—What distance will it carry?

Dr. Lewis—We used to advise, when asked that question, in locating a pest house, one thousand feet from a habitation or a frequented road. I went down to Kings Park a year or so ago, when they had an epidemic, and found they had established a pest house within two hundred feet of their largest pavilion. I thought that was too near, but it was quite far enough. They had severe cases, but it never extended from the pest house which was two hundred feet from a building containing at least two hundred and fifty people. So there can be no fixed rule about it. I believe, now, from the experience I used to have in New York city before we transported all of our patients to the Island, that we had just as successful isolation on the top floor of a private house in the city as if we had taken them four miles out. It depends upon how carefully the person is isolated or kept from contact with other people.

Delegate—I mean from a legal point of view. We had some cases which we isolated about a quarter of a mile from everybody. It was at least a quarter of a mile away, and the county failed to pay the bill, on the ground that we should have burned the clothing, or something of that sort.

Delegate—Is it possible to have smallpox without any eruption?

Dr. Lewis—Is it possible to make a diagnosis without any eruption? I won't say anything about it.

Tomorrow morning we shall have an exceedingly important paper on some legal aspects of sanitary work. We will adjourn until 10 o'clock to-morrow morning.

MORNING SESSION.

FRIDAY, *December* 16, 1904.

The conference was called to order by Dr. Johnson.

Dr. Johnson—Mr. Church will answer such questions as are presented to him in reference to the matter that was brought to your attention yesterday.

Mr. Church—I had three inquiries submitted yesterday and they are all practically on the same line, referring to the matter of compulsory vaccination:

"If the board of education don't require vaccination, can vaccination be enforced by rule or ordinance of the Department of Health?"

"Whose duty is it to see that the law excluding unvaccinated children from the public schools is enforced?"

"How may the law excluding unvaccinated children from the schools be enforced?"

I have since I was here yesterday examined at some length the question of the interpretation of this statute, and that is what it comes right down to,—what is the proper construction of this health law?

I am going to read it again to you in order that you may understand its provisions:

"No child or person not vaccinated shall be admitted or received into any of the public schools of the State, and the trustees or other officers having the charge, management or control of such schools shall cause this provision of law to be enforced."

Now there is no question about the questions submitted here, as to whose duty it is. That statute puts it right up to the trustees of the school.

Then it goes on to say: "They may adopt a resolution excluding such children and persons not vaccinated from such school until vaccinated and when any such resolution has ben adopted they shall give at least ten days' notice thereof by posting copies of the same in at least two public and conspicuous places within the limits of the school government and shall announce therein that due provision has been made, specifying it, for the vaccination of any child or person of suitable age desiring to attend the school, and whose parents or guardians are unable to procure vaccination for them, or who are, by reason of poverty, exempted from taxation in such district."

After a careful examination of the rules laid down in the textbooks for the interpretation of statutes and an examination of many of the cases in this State, I have reached the conclusion

that where it says they may adopt a resolution excluding such children or persons not vaccinated, that the courts in construing that will say that word "may" means "must," and that they *must* adopt a resolution excluding such children and persons not vaccinated from such school until vaccinated.

In other words, that the statute is mandatory in its nature, and having reached that conclusion, I think that it answers all of these inquiries that have been submitted. If I had time I would put the matter in the form of an opinion and have cited authorities.

The gentleman from Waterford who made inquiries yesterday I think is not here this morning, and will some one inform him when he comes, if he will write me a letter giving his name and address, I will undertake to furnish him with an opinion on the subject, if he will do it right away.

Anything further on that question that any one would like to ask?

A Delegate—I would like to ask what the penalty is if a board of education refuses to comply with this law? As far as I have been able to ascertain there is no penalty provided for refusal to do it.

Mr. Church—There is no penalty, but where a duty is imposed upon a public body by statute, they may be compelled to perform that duty by a writ of mandamus.

A Delegate—Having been a member of a school board for some years I would like to ask: A certain person refuses to have a child vaccinated and the truant officer is sent out to bring it in. How long can we exclude it from the school providing the parents will not allow it to be vaccinated?

Mr. Church—I think you can exclude them from the school right along till they are vaccinated.

A Delegate—Indefinitely?

Mr. Church—Yes, sir.

Delegate—And the truant officer can not take it back?

Mr. Church—No, and the education authorities I understand have provided a system of education for such children at their homes.

Delegate—Would the refusal to vaccinate that child be obstructing the Truant Law?

Mr. Church—Not in the sense that any one would be liable for the penalty, I think.

Delegate—There are cases where the question arises: What is vaccination? The fact of sacrificing the arm or abrading it and placing vaccine upon it is not a legal vaccination as meant by the law as I understand it. There are cases that never had the vaccine virus take effect upon the system and you can not make it take effect upon the system. There would be a case where an attempt had been made to vaccinate and yet under the provisions of the law he should be excluded from the school.

Mr. Church—It seems to me that you are now getting largely into the province of medicine rather than law. I don't know as a matter of medical knowledge what is considered to be complete vaccination,—as to whether it is necessary for the virus to work or whether it is not. I think that is a matter that should be settled by discussion among yourselves.

Delegate—If the trustees should refuse to order these children vaccinated would it have any influence on the public money of the schools?

Mr. Church—That would be a matter that would rest with the Department of Education largely. I don't imagine that they would refuse the public money unless some special case arose in the neighborhood and an epidemic of smallpox was threatened or something of that kind.

Delegate—I would like to ask with reference to what constitutes vaccination: The pupil offers himself for vaccination. The doctor attempts to vaccinate him. It does not work, it does not take effect. The pupil has not refused to be vaccinated and it is not the pupil's fault. Would you advise the exclusion of that pupil under those conditions?

Dr. Lewis—I can answer that question. There is no question whatever that the intent of the law is to protect the people in that school from smallpox, and if as the Doctor suggests a person has been tried and could not be successfully inoculated, that child is not in danger and the health officer would be in the

line of his duty to send the child back to the school with a certificate to that effect if necessary. There is no question about that.

I know one or two people who can not be vaccinated. I have tried one man for the last 25 years every winter and I can't vaccinate him.

A Delegate—How many attempts would be necessary? Would one or two attempts be sufficient or would you leave it entirely to our judgment?

Dr. Lewis—It must be left to your judgment.

Delegate—After the second attempt the child should be allowed to go back?

Dr. Lewis—I should make a third attempt. The first time the virus might have been bad; the second time my operation might have been defective, but the third time, having had experience with two failures, I probably should do a proper vaccination.

I have been asked to call attention to the fact that we want those questions which we generally receive, and we want the questions sent in as has been the custom in other conferences. There are some here now, and during the day we will find an opportunity to have them all answered.

We are now to have the pleasure of listening to a paper upon "Legal Methods and Forms of Procedure in Sanitary Work," by Major C. H. Hitchcock of Binghamton.

LEGAL METHODS AND FORMS OF PROCEDURE IN SANITARY WORK.

In discussing legal methods and forms of procedure in sanitary work, I wish at the outset to state that in considering how I might best present the subject it has seemed to me that it might best be presented in the form of a narration of experience, showing how difficulties were met and problems solved in one municipality; and how a comprehensive system of work was involved which, while probably not the best that could be devised, has at least the merit of standing the test for ten years' practical experience, and of having substantial merits to commend it. The work to be done and the problems to be met differ throughout the State,

not in kind, but only in degree; and what has proved healthful in one locality can not but prove useful in another. Moreover by comparison of forms and methods of work only will it be possible to arrive at the best.

It is almost exactly ten years ago that in the municipality in question the first steps were taken to formulate a system of work. Prior to that time the local board had adopted certain brief sanitary rules and ordinances covering only a single printed sheet or leaflet. These had been adopted years before in 1883, and while they might have been adequate to the limited needs of the community at the time of their adoption, they were almost absurdly inadequate to the needs of a city of 35,000 inhabitants. There were at the time no rules regulating or defining the duties of officers or the conduct of the meetings, nor were there any rules of procedure. The health officer had been performing the duties proper to his office, and in addition those of secretary and registrar and for the greater part of the time those of sanitary inspector. The members of the board likewise did much in the way of making inspections in person at large sacrifice of time. Meetings were held at monthly intervals. At these meetings the time was largely consumed in listening to "complaints" from members and others. Each matter that was presented was necessarily made the subject of a special resolution proposed impromptu to meet the real or supposed necessities of the case, after more or less extended discussion. The amount of work done under these circumstances was limited, often of doubtful efficacy and questionable legality.

But aside from the amount and quality of the sanitary work done, this system, or more properly lack of system, was open to another objection of a more serious nature. In his natural desire to accomplish desirable results, the health officer was often led to issue orders, take action and incur responsibilities, which were beneficial to the community, it is true; but were unwarranted under the Health Law, or under any rule or order of the local board. The health officer, thus instead of being as contemplated by the law, a purely executive officer, found himself by force of circumstances invested with a wide discretion, not only as to how the particular thing should be done, but as to what things should be done. He came thus in many cases in

danger of incurring a personal liability for acts which, although sanitary and salutary, he was without legal warrant in doing.

The enactment of the Plumbing Law about this time imposed further and additional burdens of work upon the board and its officers, the due and proper accomplishment of which were a practical impossibility under the conditions then existing.

The local board in question was at this time fortunate in having a health officer of comprehensive views by whom the situation was fully appreciated, and who was earnest and energetic in the desire to inaugurate a systematic plan of work adequate to the growing needs of the municipality; and which, while in strict conformity with the law, would result in the lightening of the work for the board and put the work on an organized and efficient modern basis. The local board was in entire sympathy with him in this desire, as the necessity for measures of the kind had long been as apparent to them as to him. The entire matter was therefore referred to him, and to an attorney of his selection, to advise and report upon a plan for the entire reorganization of the work of the board and its officers. As a result of their joint labors a new and comprehensive sanitary code was proposed, and after due consideration adopted.

Before going into any details in regard to its substance, it may be said that this code has with unimportant modifications continued in force to the present day and proved adequate to all the necessities. During this time the volume of work done and results accomplished has increased many fold. While an increased force of office employees has of course been necessary, the sacrifice of time and labor on the part of the members of the board is no greater, if in fact it is as great, as it was in the days before the code was adopted. The members of the local boards of health as laymen and serving without compensation have a right to be relieved of all duties but those of a purely deliberative nature; and, except in the rare instances of emergency, these duties should be confined to attending and participating in the regular and special meetings.

The committee charged with preparation of this code and system considered in the first place that any deliberative body created by law has inherent authority to regulate its internal organization, and the manner and means by which it will accomp-

lish the duties by law imposed upon it. Upon this principle a chapter was framed by which the time and place for holding regular meetings, and the manner of calling special meetings, the notice to be given, the order of business and kindred matters were regulated. I would say here by the way, that the importance of this is sometimes very great. There are cases on our books where the action of a local board of health in an important matter has been held null and void and without jurisdiction, for the reason that the action was taken at a special meeting, notice of which had not been given to each and every member of the board.

Under the authority conferred by law upon the board to appoint and employ such officers and agents as are necessary to enable them to perform their duties, a second chapter was formulated defining and specifying the powers, duties and special work of the several officers, agents and inspectors of the board and regulating the manner of their tenure of office. You will see the importance of this as well, because unless there are some permanent rules defining their respective duties, each matter that cames up will have to be referred by special resolution to some one or another who is charged in the resolution with the execution of it.

In addition to these chapters mentioned two others were formulated the first of which comprised the general sanitary ordinances of the municipality, and the second the rules of procedure. These chapters it is my purpose to discuss with some particularity, as the subjects merit.

In drafting these ordinances and regulations the committee at the outset recognized the fact and principle that under the law of the State neither the local health officer, nor any other employee of the board, has any discretionary powers properly speaking. Their offices are purely executive, and their duties are to enforce the State laws and the local regulations. In the performance of these duties they have only such discretion as any executive officer has,—that is, he may and, in fact must use discretion as to how he shall administer the law. The health officer, however, can not make sanitary regulations, nor can he adjudge a nuisance to exist, or make a final order for its abatement. These powers are vested solely with the local board.

The committee recognized and took into consideration the fact that under the Health Law two classes of nuisances are recognized; first, those facts and circumstances which constitute a violation of a local ordinance; and second, those facts and circumstances which, although they threaten the public health, do not constitute violations of a specific rule or ordinance. In the case of a violation of a just and reasonable local ordinance, the sole question which arises is, is there in fact such a violation. An ordinance for example, forbidding the construction or maintenance of vaults and cesspools in a thickly settled and well-sewered location, would be just and reasonable, as long and universal experience has shown that such a measure is conducive to the public health. In the event of a proceeding for a violation of such an ordinance, it would be no defense to allege or show that the particular vault or cesspool was in fact sanitary or that it harmed no one.

In the other class of cases, however, the facts and circumstances must constitute an actual nuisance or threaten the public health; and the question in these cases is one which the local board only can pass upon; and abatement can only be ordered by the board when it has determined upon sufficient evidence that a nuisance in fact exists.

You will find on looking over the numerous authorities which exist in the law books in this State that the fact of nuisance is recognized in all the cases as jurisdictional. Every lawyer knows how important a matter is which is jurisdictional. If there is jurisdiction there is ample grounds for all the authority which the law confers. If there is no jurisdiction, there is no foundation for any authority whatever, and anything done is null and void, and any action taken where there is no jurisdiction may constitute a trespass.

The sanitary ordinance can properly be left to executive officers to enforce; but each alleged nuisance which does not violate a general ordinance must be the subject of special action and investigation on the part of the local board.

With these principles of law in view it became evident to the committee that the prime essential toward systematizing, simplifying and shortening work was a comprehensive, specific and well-

devised code of sanitary ordinances, to cover, if possible, the greater number of commissions and omissions which tended to endanger the public health. After an examination of many codes of rules, and a careful investigation and consideration of special local conditions, a code of ordinance was prepared which was adopted and with some minor amendments and additions remains in force at the present day.

In order to insure the enforcement of these rules and to provide a speedy and convenient procedure in the case of nuisances other than violations of an ordinance a chapter of rules of procedure was adopted, following closely the provisions of the law.

The first of these rules required all complaints to be made in writing and in detail on a form provided for the purpose. No person is now allowed to make an oral complaint, and thus take up time at a meeting. Naturally anonymous complaints are ignored and rejected unless the health officer of his own notion sees fit to make an investigation. All complaints are regarded as confidential and the name of the complainant is under no circumstances disclosed.

A second rule requires the health officer on the filing of a complaint to cause an inspection to be made. He must also cause an inspection to be made on the request of a member of the local board, and may order inspections at any time on his own motion. The report of the inspection is required to be in writing upon a form provided for the purpose. Should the inspector show no violation of an ordinance or no nuisance the matter of course terminates without being brought before a meeting or any further action. If, however, the report shows the violation of an ordinance or that there is reasonable grounds for the belief that a nuisance exists, the health officer is required by another rule to cause a notice to be served upon the responsible party informing him of the substance of the report and requiring him to abate the alleged nuisance within a limited time or show cause at the next meeting of the board why he should not be fined for violation of an ordinance, or why a nuisance should not be adjudged to exist and its abatement ordered. The matter then for the first time comes before a meeting of the board; and it will also be observed that in the

very numerous class of cases where the offender complies upon the first notice there is no necessity for any action.

In the comparatively few cases where the delinquent appears and defends the proceedings he is heard and the matter disposed of in accordance with the facts shown. If the delinquent does not appear and has in the meantime failed to comply with the alternative order, the board at once proceeds to determine that a nuisance exists, and makes a peremptory order for its abatement. It may be observed in passing that while the local board has jurisdiction to declare and determine that a nuisance exists, they have no jurisdiction to order its abatement in any particular manner. This is an important principle of law that must not be forgotten. The forms that are provided for under the rules in question only require the abatement of the unsanitary conditions. As a guide, however, to the delinquent at the foot of the order, but separate from it, is a space, in which he is informed that "The following will be deemed a compliance with the above orders," to which are added plain and brief directions for effectual abatement. Additional rules require the inspectors of the board to follow up each case and make written reports of the compliance or noncompliance of the delinquent, and for such further action as the facts in the case may warrant. Ten blank forms were devised and adopted conforming to the rules in such a manner as to meet the requirements and circumstances of nearly every possible case, thus greatly reducing the amount of clerical labor required, and assuring action in due and legal form, and a detailed record of everything done.

The system of procedure thus inaugurated was at first confessedly an experiment; but now after ten years' practical experience it is conclusively shown to have the advantages which it was designed to afford. To recapitulate, these advantages are:

First. At least fifty per cent. of the nuisances which come up to the attention of the health officer or his subordinates are abated without the necessity of any action on the part of the board. Of the remainder at least four fifths are disposed of by formal action without debate. The remaining ten per cent. as a rule cause but little trouble or expenditure of time.

Second. For the reasons given the volume of work accomplished is greatly increased.

Third. These results are all brought about by strictly legal means, and without making it necessary for the health officer or any other employee of the board to overstep for one moment the strict limits of the law.

Fourth. The forms adopted and their use in conformity with the rules insures the preservation of a complete and authoritative record of everything done in every case in such form that conclusive evidence could be given at any time in a court of law. Each case that is taken up can never be forgotten or lost sight of until it is duly prosecuted to its proper termination.

The duties now imposed by law upon local boards of health are so important and often so extensive and varied, that the formulation and adoption of careful and systematic plans of work is important in the highest degree. The members of such boards are laymen, usually men of sound sense and good judgment; but serving as they do without compensation, they can hardly be expected to qualify themselves as either sanitary experts or as competent to pass upon the delicate and difficult legal questions which often arise. In matters sanitary the health officer is their unqualified and competent adviser. But to insure the legality and propriety of its acts and proceedings the board should maintain close touch with competent legal advice as well. The expense incurred for this purpose is a just and proper charge upon the municipality, as part of the necessary expenses of the board. It is probably unnecessary that an attorney should be regularly and permanently employed in the small municipalities; but in all cities and many of the larger village corporations, the advice and assistance of a competent attorney in formulating rules and ordinances, and in attending all meetings and supervising proceedings, will be found to yield large returns upon a small expenditure.

I thank you, gentlemen, for your attention, and will simply state in addition that I have for such of you as may care for a copy, printed copies of the rules of procedure to which I have alluded. The forms that go with them any competent attorney could get up from those rules. I will have the forms left on the desk below, and any who are sufficiently interested are welcome to a copy.

CHAPTER V.

Procedure in Cases of Nuisance.

§ 1. All complaints of nuisance shall be made in writing, and shall designate as nearly as possible the location of the alleged nuisance, the name of the owner, or his agent, and of the occupant of the premises, the nature of the alleged nuisance, and the reason why the same is believed to be detrimental to the public health; if such alleged nuisance is in violation of any rules or ordinance of this board the particular rule or ordinance shall be designated.

§ 2. It shall be the duty of the health officer upon the filing of a complaint, to make, or cause to be made by a sanitary inspector, an inspection of the alleged nuisance, and to cause a written report thereof to be filed with this board; which report shall specify as nearly as may be the same particulars required to be stated in a complaint.

§ 3. The health officer shall make, or cause to be made, an inspection of any premises whereon he believes a nuisance to exist, or whenever so directed by this board or by a member thereof; and shall cause a written report, in the form above prescribed, to be made and filed in each case. He shall furnish a copy of each report to any interested party that may require the same.

§ 4. In all cases where the health officer, on any report made and filed, as required above, shall have reason to believe a nuisance exists within the jurisdiction of this board, he shall forthwith serve, or cause to be served upon the owner, his agent, the tenant or person in possession of the premises whereon such alleged nuisance exists, a notice stating that such inspection has been made, the particulars thereof, and requiring him to abate such alleged nuisance within a reasonable time to be therein designated; or in default thereof, to show cause before this board at a meeting thereof, at a time and place to be designated therein, why the facts and circumstances shown in said report should not be declared to constitute a nuisance, and its abatement ordered by this board.

§ 5. In no case no owner, agent, tenant or person in possession can be found with due diligence, the notice prescribed in the

previous section shall be served by posting the same in a conspicuous place upon the premises, and by mailing a copy of the same to such person at his last known place of residence; but in case such residence can not be ascertained with reasonable diligence such mailing may be dispensed with.

§ 6. In case such alleged nuisance is not abated in accordance with the notice above provided for, this board may proceed, upon due proof of service of said notice in the manner above provided for, in the absence of the party in interest, at the time and place designated in said notice to declare the facts and circumstances reported upon to constitute a nuisance, and order and direct its abatement within a specified time.

§ 7. If any person or persons in interest shall appear at the time and place designated in said notice, this board shall hear the allegations and proofs of such persons, and render its decision thereon. The board may in its discretion, in any case, make such additional investigation by such persons or means as it may deem proper, and may adjourn its proceedings from time to time as may be necessary for such investigations, and for deliberation thereon.

§ 8. In case this board shall determine, in the manner aforesaid, the nuisance so adjudged to exist to be a violation of the rules and regulations of general application, the board may in its decision thereon, impose the penalty prescribed for such violation; and may in addition direct the prosecution of the person maintaining the same for a misdemeanor under the provisions of the penal code.

§ 9. When the board has rendered a decision in any case declaring a nuisance to exist and directing its abatement, the secretary of the board will forthwith serve or cause to be served, in the manner prescribed in sections 4 and 5 above, upon the owner, agent, or occupant of the premises upon which such nuisance is adjudged to exist, a copy of such decision and order, together with a notice requiring a compliance with said decision and order under the penalties prescribed by law and by the rules of this board.

§ 10. If the decision and order provided for in the preceding section is not complied with, this board may, upon due proof of such noncompliance, and of the due service of such decision

and order, impose upon the party in default prescribed by law, and by its rules, for a violation of, or failure to comply with the same; and may proceed to abate the nuisance in question according to law.

§ 11. When a penalty has been duly imposed by this board for a violation of any rule, regulation or order, a notice of the imposition of such penalty, requiring the immediate payment of the same, shall be mailed by the secretary to the person or persons upon whom the same was imposed, addressed to such persons at their last known place of residence.

§ 12. When a person has been duly served with any notice or order prescribed by these rules, the health officer shall cause a report to be made of the compliance or noncompliance of such person with the notice or order at the next meeting of this board after the time limit in such order or notice has expired, with any recommendation he may consider proper.

§ 13. A copy shall be retained of each order or notice prescribed in these rules, and upon each retained copy shall be indorsed the time, place and manner of service upon each person to whom the same was directed.

§ 14. Nothing contained in the foregoing rules shall be deemed or construed to abridge or limit the right of this board to abate nuisances without notice, or do any act enjoined or permitted by law, when necessary for the public health and safety, in such emergencies as, in its judgment, require proper and vigorous action.

Dr. Lewis—This interesting and instructive paper by Major Hitchcock is now open for discussion. I think Dr. Hix ought to open the discussion.

Dr. Hix (of Binghamton):

MR. COMMISSIONER AND MEMBERS OF THE CONFERENCE: I hardly understand why I ought to open the discussion, unless it is that the Commissioner thinks I am more familiar with the gentleman who has just addressed you than the rest of you are.

Before I attended these conferences of health officers I had an impression that the medical profession was a profession that

was not gifted with ability to discuss questions or to talk. I thought that belonged to the legal and to the ministerial professions, but as I have attended these meetings I have concluded that there is a considerable "gift of gab" among the medical profession.

I wish to say in connection with this work that the volume of the work done by our local board has increased many fold. In fact while the board of health only had to deal with and bring to an issue in 1893 300 specific cases, in 1903 they dealt with 1,000 specific cases. Their work was expedited and the facts are that they do not spend nearly as much time as they used to with the matters pertaining to the board of health. In fact to be a health commissioner is not at the present time in our city a nuisance for the man who holds the position. While some years ago it was considered to be really not much of an honor to be a member of the board of health, today we find many men who consider it an honor to be associated with a body which has for its objects the betterment of the health of the community and the officials, these members of the board of health, believe that it is an honor.

Another thing that this mode of procedure, this careful one has done in our work: It has inspired the officers and the members of the board with confidence in their work. We don't hesitate when we issue one of these orders. We have no fear that there may be some legal complication connected with the resolution passed. We know from this experience that there will be no complications that will be a detriment in any way to the members of the board nor to any of its officers so long as we keep along the line outlined by the speaker.

Another thing: Our board never commences, and in fact in very few instances has the health officer commenced a piece of work but what it was brought to a successful issue in our municipality.

And there is another thing: We have never been prosecuted in any way that has been a detriment to the health officer financially or in any other way, or to any member of the board.

I wish to speak a little in regard to a side of our work, probably not the legal side, but it relates in a measure to the legal side: In a republican form of government like ours we can not

take as radical steps as they can in more centralized governments. We have got to depend on the educated cooperation of the public in order that we may accomplish good along the lines of work laid out. For instance, take Germany. In a moment, by the command of the Emperor, great advances have been and will be made in sanitary matters. Among our people we have got to agitate the question. We have got to get the cooperation by agitation and an effort to educate the public; but it goes without saying that the intelligent, educated cooperation of the public will accomplish the result, much more satisfactory results than will a forced and unreasoning cooperation.

Now among our duties, it is our duty to educate, gentlemen, the legal fraternity and the ministerial fraternity, but especially should we educate the legal fraternity. As an illustration, one or two years ago gentlemen who have appeared before you would not have taken the advanced step which Mr. Church just took, the positive step in regard to vaccination and where the responsibility lay. He would not have done it then as he will now. He has become educated up to the idea of sanitation which he never had before he became interested in the work.

If you haven't a legal man, an attorney, connected with your board, no matter how small your town may be, interest a legal man with you, and by that means you will educate the legal fraternity. Today judges are rendering opinions very much in advance of what they would have rendered only a few years ago. I tell you, gentlemen, our work as health officers is educational. We are called executive officers, but we don't do our duty unless we especially make an effort to educate the public in sanitary matters in our form of government.

Dr. Lewis—We will now hear from Dr. Greene, of Buffalo.

Dr. Greene:

MR. COMMISSIONER AND LADIES AND GENTLEMEN: I am delighted to hear the sentiments expressed by Dr. Hix because they are so thoroughly in accord with my own, and usually when we find another man who thinks as we do, we like him all the better. This is a campaign of education. You can make all the laws you want for the government of people as far as health is concerned, but they are going to feel that they are imposed

upon and persecuted as well as prosecuted and that they are looked upon with scorn unless you can make them feel that you are doing your duty and that if they don't conform to certain rules, that they are delinquents and are the persons who should be prosecuted; and I believe that it is the duty of every health officer in every city, municipality or town, where he has to resort to or threaten legal methods, to take that delinquent in hand and try to show him or her wherein he errs, and that the health officer is doing the right thing in protecting the health of the people.

In Buffalo, especially, where we have a very large foreign population, where many of them don't understand why these things have to be done, I believe it is the duty of the health commissioner there to take these people in hand and by kindness and consideration, at the expense of his time as well as his temper, to impress upon them the necessity for, and I always show them the reason why, and then you can always have a friend afterward, even if you oppress him, as he calls it.

We had a case of a tenement house which had been an eyesore to the Department for several years which was owned by a woman of foreign birth who could hardly speak the English language. After having her in court and indicted by the grand jury she fixed up her place, and I sent down an inspector yester day to see if it was done, and the smiles of that woman were wonderful. She was more pleased than any one in the Department. She took him from the top to the bottom of the house and said, "Isn't that nice? I am glad the doctor made me fix it up." If you can get people in that frame of mind you are going along a line of education which will be lasting and final. In these days of deeper investigation in regard to all questions, sanitary or otherwise, I believe that is the position we must at all times take.

In Buffalo some of the departments have uniforms on their men. I have refused to do it for the reason that many people of foreign birth, Polish and Italian people, have lived in the old country under a form of government where it was ruled by the bayonet and they did nothing unless they were driven to it by uniformed men and I do not propose to send among those people men with uniforms and brass buttons. I want them

to feel that my men come among them as their friends and the friends of the community. I believe if we go on in that sort of way we are going to win and win permanently.

In regard to vital statistics, it occurred to me (it is foreign to this subject) that in looking over the departments we should be exceedingly careful in our vital statistics. Just now we have in process of consideration, I might say, in the Department, a certificate of a death which occurred December 16, 1883, and has never been filed until now. What became of the man I don't know, but it was just filed and it is in court now as to what shall be done with it.

Another thing: It seems to me that we should insist that we have our marriage certificates filed. Only last year we had a fortune of $200,000 dependent upon the filing of a marriage certificate. The clergyman had never filed it and we had to get him in court, to get a warrant for him, before he would file it, showing the needs and the necessities of eternal vigilance on the part of health officers. I thank you.

Dr. Lewis—We would like to hear from the health officers of some of the smaller municipalities. Perhaps the problem is different there from what it is in Buffalo which claims to be the second city of the State, I believe.

Dr. Phillips—I will make my remarks very short, but I want to say this,—that in my work as health officer in the village of Morristown, the board of health and the board of education work in harmony. We have made it and they have made it the practice that the board of health shall sustain the board of education and the board of education shall sustain the board of health, especially in the questions relating to the vaccination of the children of our public schools.

Mr. Allison—I am a registrar, not a physician. I was listening to Dr. Greene's discussion about the filing of vital statistics, and it seems to me that the law should be more strong upon that point. We have a great deal of trouble with the physicians in our town trying to get them to file certificates, and it does not seem reasonable that the registrar should attend all the baby matinees in his jurisdiction in order to get the certificates of

the births. I have a case in mind that happened last month during a regular meeting of the board. A man came in and asked if his child was registered. I looked over the book and said no, I could not find the entry. He said, "I demand that it be registered." I said, "You get your physician to send a certificate and we will register." He said, "The physician is gone. He does not live here any more." I said, "You give me the points and I will make it out and sign it and send it up to Albany." It was born in 1896 and I made the certificate out and entered it in our registry and sent it to Albany expecting that the Commissioner would ask questions as to why it was not filed before, but he has not,—probably he has not had time.

I know of several cases all through the village where births and deaths have occurred and the certificates have never been filed and it is impossible to find out who the doctor was that attended them.

In another case there was an inquest over the death of a child and the certificate was not filed with the registrar. When the health board gets after the coroner it is going to make quite a legal fight. I think that law should be made stronger so that coroners and physicians as well will have to file the certificates.

This is the first time I have attended the conference and I find that I don't know anything about the board of health laws in our village. In fact we have no health officer. I understand the health officer is to be nominated by the local board and elected by the Commissioner. I didn't know that before. I also know now that we have no bylaws. The law requires us to advertise our bylaws. That we have never done; but after the information I have received at this conference I assure you that next year the facts will be different and we will have a health officer legally elected by the Commissioner.

Dr. Wilson (of Westchester)—I would like to ask what is to be done with an undertaker who buries a corpse without a burial permit, he having the death certificate?

Dr. Lewis—I was discussing that a few minutes yesterday. I would like to have Major Hitchcock tell us whether the local board should pass an ordinance requiring that the local board should issue it.

Major Hitchcock—I think that the local board has the authority to pass an ordinance for the purpose, and in case of non-compliance with that ordinance, the local board has authority to impose a penalty for its violation.

Dr. Wilson—I would like to say that we already have that ordinance, but they still do it.

Dr. Lewis—Have you enforced the penalty?

Dr. Wilson—No.

Dr. Lewis—Does your ordinance provide for a penalty?

Dr. Wilson—I think it does.

Dr. Lewis—I think it exceedingly essential that the board should take action looking to the enforcement of that ordinance.

A Delegate—Does not the statute provide for that?

Dr. Lewis—Not to my recollection.

Dr. Prest (of Waterford)—During the past five years we have adopted largely the same form which they have in Binghamton. The statistics in regard to the board of health, the old rules and regulations, methods of procedure and all those things, were in a haphazard condition and there were no results obtained. It was a sort of a farce all the way through.

As regards the filing of certificates, etc., the statutes provide for that. The State law and the local rules and regulations provided for it, but it was not done. As Dr. Hix has said, I saw the undertakers and physicians and clergymen and I endeavored to start out on a campaign of education. I explained the importance of it and the benefits to be derived from it,—how the penalties were to be followed up in case they should not comply with it. I asked their assistance. I also explained inferentially that they were entitled to a quarter apiece for them. We got a bushel in a month right away, and ever since then it has been followed up. In connection with the registrar we looked up the bills of undertakers and clergymen and physicians for the filing of the certificates. It is true it cost the town a pretty penny that year, but since then that has been done and the village of Waterford has been 'very nearly correct in that respect since then.

As regards the rules and regulations: The old rules were crude and we obtained no results whatever. There were some blanks bought, but we got no results. I looked over a number of the rules and regulations of other towns and villages and we compared notes and looked them all up and finally with an attorney whom we employed we formulated a new sanitary code. It is not perfect and we have found things to change but with the exception of a few amendments it answers the purpose well. We now have legal forms which will stand the test. We have forms for complaints, which must be in writing,—there were any number of anonymous ones coming in—and when they found that they must send complaints in writing and that then they will be followed up to the limit, they are more likely to do it and not give us spite complaints. We found formerly (and in fact find some now) that a large majority of the complaints arose out of some spite cause, some quarrel between neighbors or something of that sort, and now when they find that they are followed up and investigated, they don't come up; actual nuisances do.

As regards disclosing the name of the complainant, they almost invariably come to me and I refer them to the board and say if they will appear before the board and ask for the name of the complainant, if they see fit to tell, all right. But they don't do it largely, as a rule. That is the way I turned it off,—the name of the complainant is sacred.

Through this method, through the campaign of education which we have endeavored to follow out up there, we have accomplished splendid results on that line.

There is only one more campaign of education, which I have just brought up. I have never felt secure, nor has the attorney of our board, as to the constitutionality of the vaccination law. I suppose you remember me as the vaccination fellow over there yesterday. Since that has been determined by the Court of Appeals, I have endeavored by an additional campaign of education to bring our profession and the board to my way of thinking on the matter. It has brought down a storm of criticism and all that, but we now hope that it will be done. I have endeavored to use diplomacy, all I could in the matter. I shall not try to compel them. I do not believe it is my place to get

a mandamus to compel them, but I want to get the responsibility off of my shoulders.

If the inspector will come around and talk with the medical profession and undertakers and explain the advantage of giving in reports and what will happen if they don't, and incidentally the fee attached to it, then you will find that reports will come in promptly.

Delegate—As regards undertakers, I wish to give a little experience I had. There is an undertaker in an adjoining town who comes into my town a great deal. About two years ago he came into a church while a burial was going on and he brought a certificate for me to sign. I happened to be away and he buried the man without a permit. I gave him a little piece of my mind in regard to it. About a year afterward a man was buried without a permit, without my signing his death certificate. He had been one of my patients. I went to the sexton and he said he had a permit but no certificate was signed. The permit had the name of one of our board of health from my town, but it was not his signature. I asked him in regard to it and they said they would give their consent to this undertaker as it would be more convenient for him to sign his name, as he lived in an adjoining town. What shall we do with such a man?

Dr. Moriarta (of Saratoga)—It occurred to me in listening to the discussion, when one man said that their board had no regulations and another doctor said that they had very good ones, if it would not be possible for the Commissioner of Health to have some act brought about that would make the regulations for city and village boards of health mandatory, to be adopted by them,—for the central body to adopt rules and regulations which the local boards must adopt, particularly in relation to communicable diseases.

I am so situated in our little village that we occasionally have to go into the country and see cases. Their quarantine at times is very bad. The board of health and the health officer have different ideas. At present I know one school that practically ought to be closed, that is outside of the village limits, and it is due to the fact that the town board of health and the town health officer have not reported it properly and so the whole community

has suffered. If you could have some rules and regulations along that line that would make it mandatory for that town board of health to do these things regardless of its views, it would be well. It has often occurred to me, and I wish that it might be taken up by the committee if you have such a committee.

As to Dr. Green's theory about the men not being uniformed, I don't agree with him. We have a community of Italians and they are certainly bad propositions. I don't have any trouble. One year we insisted on having an inspector in brass buttons, and that was the best year we had. I am not in favor of an inspector going among a lot of Italians as a friend. I think they have lived at home with people in uniform who have force and power, and it would be well to have it carried out here. I think perhaps the expense of the matter in small villages is to be considered, but leaving that out of the question, I do think that a uniform is a good thing for any health officer.

Dr. Scott (of Niagara Falls)—I want to say that I have just passed through an experience in preparing a sanitary code to take the place of an obsolete one under which we were unable to do any effective work and which we could not enforce. This code was formulated in conjunction with our city attorney and I must say that the code differs from the ideas which I have heard expressed here this morning and in the papers of the morning, to this effect: that is that the health officer has no power whatever so far as the abatement of nuisances is concerned; his functions are purely executive. We have provided in this code (it may not be correct) and we have copied some of it from Buffalo's code, knowing that the method of procedure is specified in Buffalo's charter. This code provides that the health officer shall send a notice that the nuisance exists and that it shall be abated. In case it is not abated, it provides that the party whom it is directed against shall appear before the health officer for a hearing and that he shall render a decision in the matter as to whether a nuisance exists and in what manner and time it shall be abated. It goes on and provides that in case it is not abated at the end of that time, the health officer shall have power to cause the same to be abated in such manner and time as he shall direct, provided the man to whom the complaint is directed does not serve an appeal upon the health officer and the final appeal

is to go before the board of health if he desires before the abatement of the nuisance.

I don't know as this is legal and I only have the advice of our city attorney that it is legal. It would seem to me that even though the health officer's duties are purely executive, that the board of health and common council by the passage of an ordinance would have the power to direct the health officer, to delegate a certain portion of their duties to him to carry out if they so desire. That would seem to be a reasonable construction to put on that law, as Major Hitchcock has expressed it in his paper.

In regard to a uniform, I must say that I agree with the last speaker. We have not in our city uniformed men. It has been my desire for some time to have them uniformed or at least wear a cap; at present they only wear a badge which they usually wear under their coat where no one can see it unless they are obliged to show it. I say this because I have found that where it is necessary to use a little moral suasion we can do it among foreigners, among whom Dr. Greene seems to think the friendly idea should be carried out (we have a large population of them at Niagara Falls) by taking a policeman in brass buttons,—if I send him along with the inspector I usually get what I want done without any difficulty.

Dr. Halpin—Mr. Chairman: Drs. Hix and Greene and others who followed them have painted the duties of the health officer and the workings of the health board in rather roseate hues I think. Now there is a different phase of it. The health officer (and I speak in the interests of the health officer) sometimes has duties to perform and he meets these duties when he has to have backbone. There is opposition, and sometimes he needs to put on his boxing gloves—he has to fight.

Mr. Commissioner, I wish to relate, I won't say a personal experience, but a matter that has come under my personal observation, where a health officer needed that code, where he was opposed even by the board of health, and I will relate to you in a brief way the conditions and circumstances relating to this.

A fever occurred in this neighborhood of which I speak. They had for medical attendant a man of ability who was formerly a

health officer of the same precinct. The medical attendant reported the case to the health officer in the usual way. Everything went on and was done secundi morti and in about a week from the receipt of the complaint the medical attendant reported the case as all well and that in his opinion the quarantine might be raised. The health officer accordingly visited the family and in conversation with the parents of the children affected in regard to the cases, was about to comply with the request of the medical attendant when the mother casually remarked that the children were all well, but so and so had patches in the throat yet. Mark you, cases of diphtheria, if they are well, have no patches that are to be observed ocularly in the throat. So this health officer asked to make an investigation. Very reluctantly on the part of the mother the child was produced and the health officer made an investigation and found there, as I was informed, decided diphtheretic patches still remaining in the throat of that patient. He said, "It is hardly safe to raise this quarantine. I am a little afraid there is present bacteria still and bacilli are there. I will advise with your medical attendant and let you know. I won't remove the quarantine." And he didn't. He communicated with the medical attendant and advised him to keep these patients under treatment a little while and stated what he had found. The medical attendant did so. He treated the patients for a few days longer, about three days I think, and then reported to the health officer that everything was all right and to remove the quarantine.

Again that health officer attended and made an investigation and found still the same condition of affairs. He said, "It is hardly advisable to remove the quarantine and I will see your medical attendant about this. I am a little afraid to remove the quarantine at present." And he tried to be politic and smooth and not to offend. My acquaintance with him would lead me to believe that he was a conservative man and careful. He saw the medical attendant and he was very much chagrined about it and he reported that the patients were well and that the house had been thoroughly fumigated and was clean and everything was all right.

In the meantime he saw another patient who had not had diphtheria at all but there was a very suspicious discharge from

the nasal cavities, and he said, "Here is a case of nasal diphtheria," and the medical attendant said, "No, there is no diphtheria about it." He had not treated the case, but he was sure it was all right. That went on, and it seemed that the board of health were in perfect sympathy with this medical attendant. They believed every statement that he made in regard to it, and the board of health made up their minds that the health officer was entirely wrong, and that he was keeping this man, the father of the family, who by the way was a school teacher and about to commence his school, and the health officer had all this in mind but he refused to remove the quarantine.

The board of health called a meeting and heard the statement of the medical attendant and he brought a couple of witnesses both of whom had been health officers and they stated that to the best of their knowledge and belief there was no diphtheria present there. And they heard the statement, I believe, of the health officer also, but it was not worth so much. The board of health ordered the quarantine raised. The health officer told me (it happened that he had some backbone; possibly our Commissioner remembers the instance as he had to do with it) that things were going on in a bad way, and there was too much fighting, etc., and he wished that something might be done. Accordingly I requested a man from the State Department of Health to go down and make some investigation and he did so and took from this nasal case and from other cases (and by the way they had a case hidden away at the time that the Commissioner did not see) and cultures were made and it was found that bacilli still existed in the noses and throats of these patients. Accordingly the quarantine was ordered replaced and things then went on secundi morti.

Dr. Clark (of Olean)—Mr. Commissioner, in regard to this campaign of education. I think that when these rules and regulations were first developing, the first president of the board of health that we had in Olean, the present Governor-elect, Frank W. Higgins (and you all know his method of doing business) this campaign of education was started then and things began to go pretty sharp from the first. The trouble seems to be in the lack of ability to seize the fact that a town or city will spend a lot of

money to inform their people as to what they should do and the board wishes them to do. We distributed in every house in the city of Olean a new copy of our rules and regulations and published them in the papers as required by law and it probably cost two hundred dollars before we got through. We kept that campaign of education up until the people began, instead of the board of health or the health officer, continually looking out for somebody that was not doing right, it is rather a little bit the other way,—if he is not right on the spot they are right after him. So that now they demand a thorough disinfection, not the sprinkling of a little sulphur, but a thorough disinfection under the direction of competent men.

In regard to the board of education, we worked together in our little experience with the Italian itch, as they called it, which we still have in spite of the fact that we are trying to kill it. We have cards in our schools which read: "Mrs. so and so: Your child may or may not be suffering from a contagious disease. You will take her to the health officer or your family physician and have her treated and she will not be readmitted until the health officer signs the card." The child goes to the health officer and he examines her and if he says she is free from disease she can go back to school.

Now in regard to the registration law, the trouble has been the same old story: The towns and cities would not pay what they were directed to pay. Here was a law on the books for at least, I think, two years, and while we won't build a monument to that Rochester doctor who sued the city and finally had the case up to the Appellate Court and received his ten or twelve dollars that was involved,—it cost the city of Rochester several hundred dollars to settle that case,—we have got our men to understand that they will be paid, and the bushel dropped in, and when we got them to understand that things ran along very smoothly.

This talk about getting the responsibility off on somebody else we have all been through with and the health officer seems to be the man on whom everything is thrown. For instance a labor leader comes in and wants to know "How long since you have inspected this store about seats for women?" "I don't know anything about that." "Well, here is the law." "Well,

send the inspector around." "Suppose there are not seats?" "Well, you are to see whether there are or not."

Then the barbers who wanted to take a step in advance have looked around and could not find any one else to do it and ended up by saying that the health officer of the municipality shall look over the barber shops, and the next thing a committee of barbers come in. "How many running waters have you got here?" "I don't know. What have I got to do with it." "Well, here is the law. The health officer shall see that these rules and regulations printed on this card are carried out." "All right, leave your paper." We send it to our attorney who says, "There is no dodging it, you have got to do it."

Just what will happen next we don't know, but the health officer has lots of time and generally receives such a princely salary that he don't have to practice medicine at all. The board tell him "This is all incidental. You are here and there every day; you keep your eyes open and you will make your salary just incidentally," and all that.

As, I say, the registration law apparently is working. Now this backbone business,—we all know that there are times when several sets of ligaments get a little bit limber, and it is a good idea when one member of the board gets a little bit down to suggest some osteopathic treatment, and he generally straightens up pretty quick. If the State Commissioner will get up some way in which we can protect ourselves from the surrounding towns, from contagious diseases, we are willing to say that Olean's record will be first class. We don't know what typhoid fever is, because when they turned the river on and tried the new Snow pump, we called the water commissioner up and said, "This is the last time. Do this again and we will go before the grand jury and indict you. You are a lot of good fellows and the board of health don't want to be at loggerheads with the city hall and the water commissioners,"—but when they expose you to all these things, you might still straighten up your back and do it. Of course the secretary did it and the water commissioners passed a resolution condemning him for allowing this water to come on. So we settled that and I think we can live along comparatively happy until the next conference.

Delegate—When I was on my feet I meant to have said something in regard to registrars of vital statistics. In our city we have a little trouble in getting the certificates because we don't pay twenty-five cents, but we do have particular trouble in getting reports of diseases like typhoid fever and various other diseases. While perhaps this is not so essential from the legal point of view, it is just as important from the sanitary point of view and for specific purposes, so that we can see what is going on.

It seems to me that the remedy for that sort of thing, as they do report when they are paid twenty-five cents to do it,—it seems to me that a State law should be enacted whereby twenty-five cents or a certain fee should be given for reporting these infectious diseases, in the same way as is now paid for reporting registration of vital statistics.

Dr. Peck—I enjoyed the papers of Mr. Hitchcock and the gentlemen who have preceded me, and I made up my mind that I would not say a word when the paper was being read, and I realize that we ought to be brief; but there is a question that I would like to ask and I would like to have the meeting be prepared to answer it.

Major Hitchcock said we had no right to abate a nuisance in any particular way. I dare say he is right; but our board of health ordinance says that where streets are provided with sewer accommodations people shall connect with the sewer. Now the question is, can we enforce that? Our regulations have been published according to law and everything done under the advice of an attorney. Now then, can we force people to connect with the sewer?

We find that the outside closet is a nuisance in fact, and we issue an order for them to connect with the sewer and they say, "We will simply clean them up and put in a little sulphur." Can we enforce that regulation? That is one question that I would like to have Mr. Hitchcock answer.

Major Hitchcock—The question is one which constantly occurs in the practice in each municipality. In answer to the doctor I have no hesitation in saying that a regulation requiring sewer connections within a reasonable time after a sewer has been constructed in any given street is legal and they can be required by

an ordinance of the board to connect with such sewer. A penalty can be collected in case of their failure to connect with the sewer.

But that is only one side of the question,—that is the theoretical. The practical side we have worked out very often in something like this way: You need another ordinance providing that the board of health may cause vaults and cesspools to be discontinued within limits where sewers are constructed, in their discretion; but at the same time when you direct a sewer connection to be made, you give them an order of the board directing the discontinuance of the vault or cesspool. If they don't comply with that order they become liable to another penalty; and furthermore, the board has then authority to go on the ground and take away or fill the vault or cesspool.

As a practical matter it is worked in this way: A great many persons would say they could not connect with the sewer, that they had not the money. The board would say, "Very well, we will let the matter of compliance with that order rest for the present, but you can not maintain your cesspool. We can't allow that within these limits." They say, "We must have those facilities on our premises." The board says, "That is nothing to us one way or the other. That must not continue." In case they fail to discontinue it or take it away, the board goes on there and for five or six dollars takes it away and leaves them to find other conveniences as best they may. It generally happens that they find themselves able to connect with the sewer. That little rule or regulation is known locally and familiarly as "The tip-over ordinance" and it always works.

Dr. Peck—I am very glad to get that answer because we have issued orders under our regulations several times and we have been unable to carry them through. It has been a question, however, whether we really could enforce it. That question has come up where people had no money and have been left the use of property and that sort of thing, and we have managed one way and another, by arranging with plumbing firms, etc., to pay for this improvement by the instalment plan and that sort of thing —we have managed to get along.

Another matter which has not been mentioned at all is this: In the village of Oneonta we require, when a body is brought to

our place from out of town, a local burial permit, and the question has arisen whether we have any right to require that local permit,—whether a permit from Albany or Binghamton to bury a body in Oneonta would not be sufficient to deposit it in any cemetery in the town or village of Oneonta. We read that the board of health in the exercise of its powers and duties may make and publish from time to time orders and regulations that they may deem proper and necessary for the preservation of life and health and the execution and enforcement of the public health law in the municipality. We believe that it is necessary and proper to know what bodies come in and of what they died, where they are buried and all that sort of thing, and we have published those regulations, and taken every step under the advice of an attorney, and we have provided a penalty of ten dollars in case an undertaker or any one buries a body without that local permit.

That is the second question I would like to ask of Major Hitchcock. Do you think that would hold water?

Major Hitchcock—I think it is entirely reasonable and therefore legal that the foreign permit on which the body comes into your municipality should come under local inspection and should be indorsed or otherwise viséed by your local jurisdiction.

Dr. Peck—That is good too. We are getting information that suits us right straight along.

Now just one or two words more and I am through. It seems to me that the statute should be amended and that a penalty should be attached to violation by an undertaker or any other person of any ordinance forbidding him to bury a body without a permit. It says plainly here that no burial shall take place, and all that sort of thing, until a permit shall first have been obtained, but there is no penalty. It says that birth certificates and all those things shall be returned at the proper time; but there is no penalty. I believe there is no question but that local boards of health have the right and in fact it is their duty to see that this is done and to provide a penalty, but as it is the expense of all that comes upon the municipality and the municipality don't care to go into litigation if they can possibly help it. It seems to me that there should be a penalty attached so that the expense would not come upon the municipality.

Now just a word more and that is all there is about it as far as I am concerned.

The gentleman on my right was speaking about some difficulty in regard to quarantine,—the quarantine being released by the board of health and the ex-health officer being too officious or one thing and another,—I will relate a case that came up at Oneonta. A case occurred in my village a few years ago where diphtheria appeared in the family of a physician. He had kept the matter very quiet and his neighbor told me there was something out of the way, and I went there and found two cases of diphtheria and quarantined the man then and there. That is, I said "Doctor, you really ought not to go, but if you will use the same precautions in attending these cases there that you would in attending any other case outside, I will let you go about your business. You go about your business and see these patients as little as possible and I will let you remain here, but I am going to quarantine you and put a notice on the house."

The man became violently angry and said that I had no business to quarantine them; that they had nothing but tonsilitis and that he did not feel disposed to regard my quarantine at all. I left him, and in half an hour he found me and told me that he could send out of town in two different directions and get medical advice and have them see those patients the next day and ascertain if they had diphtheria. I told him that I would permit those two physicians to see the cases and possibly they might do something to benefit them; but I said, "Doctor, don't forget to regard the quarantine." He said, "You don't propose to keep me quarantined if we have no contagious disease." I said "I shall keep you quarantined there until I am ready to let you out and I think you are safe." He said "Would you keep me in quarantine if Dr. A. and Dr. B. say that it is not diphtheria?" I said "I certainly should." He said "You can't do it. There is no law in the world that will permit you to quarantine noncontagious diseases." I said, "Doctor, the governor of the State can't raise my quarantine. You must understand me, and now if you go to make a fuss about this thing and make a hurrah, I will put you right in there tonight." And that settled it. Now that is the way to do that.

Dr. Lewis—We shall have to close the discussion immediately after the next speaker because we have another important subject for the morning session.

Dr. Veeder—The Code of Procedure is an excellent thing, and in the discussion of it this morning stress has been laid upon the question of nuisance mainly. It can be made to do very much more than that. It can be so arranged as to instruct boards of health themselves as well as the community by distributing it in printed form,—that they will not temporize with contagious disease. If you can fix up the code so that it will work, you are all right.

A case of smallpox broke out in the family of a laundry man. He had been going all over the community collecting and distributing clothing. The case was reported at ten o'clock in the morning as being a case of smallpox. He was quarantined instantly and such members of the board of health were notified as could be found that a meeting was to be held at one o'clock in the afternoon, three hours later. The board got together and had a lot of resolutions drawn up of what they proposed to do in the emergency. After talking fifteen minutes they said, "What do you think about it?" I said, "All the persons who have been exposed have been vaccinated, thirty of them altogether, and all we want is for this community to carry out what is already in these rules; so if you will provide a house to house canvass we well go around and vaccinate them and will finish it right up." I got the truant officer and an assistant and went through the town and all the contacts (?) were vaccinated, and within three or four days there were 420 people who were unvaccinated, vaccinated and our troubles were over. There were only twelve persons left except children in arms. There was no temporizing or council of war. It was like a conflagration which must be put out at once.

Dr. Lewis—Before proceeding to the next order, I would like to answer one or two questions that have been raised regarding the State Department.

The Schedule of Sanitary Regulations printed in the handbook may not be up to date, although they have been carefully revised as a model upon which the local boards could adopt a sanitary code. I believe that it would be impossible to formulate a sani-

tary code here in Albany which would fit every municipality with its varying conditions. If we are wrong about that of course I would be glad to be convinced, but we have thought that if we suggested the subjects which should be included in such a code, you could have them drawn up better yourselves than we can do it for you.

The next order is the paper on "Sewage Disposal," by Dr. Moriarta of Saratoga.

SEWAGE DISPOSAL.

DR. D. C. MORIARTA.

MR. CHAIRMAN AND GENTLEMEN OF THE CONFERENCE:—It is not my purpose in treating this subject at this time, to take up the scientific side of the problem; nor to consider the rights of riparian owners, or what constitutes a pollution of the waters of the State, or the liability to personal infection therefrom. But rather to consider it from the practical side as we have at Saratoga, and I hope I may be able to show to you that some changes in the present methods of our State Health Commission would be of value to a municipality, and so indirectly to the State, when they are forced to consider such a problem. Recent enactments of our Legislature clearly demonstrate that in the near future the Health Commissioner of the State will have remedied the pollution of our waterways, by the enforcement of our sanitary laws, and this of necessity means that sewage disposal plants must be constructed. At Saratoga, we were permanently enjoined from using the streams of the State as a terminal for our sewage and were given one year by the courts in which to build a sewage disposal plant and remove our sewage from Kayaderosseras creek. Special legislation gave the power for a sewer commission and provided the necessary funds.

The commission was appointed with power and funds to install a sewage disposal plant, a time limit of one year being the only condition. This commission organized at once and endeavored to learn where the successful sewage disposal plants were located, and their character also, if as a whole or in part, any of them, were adaptable to our purpose. The commission interviewed several men, who were eminent as sanitary engineers, and it was

apparent, after being advised by these learned gentlemen, that the sewage disposal problem was not only in its infancy, but decidedly unsettled. To dispose of the sludge seems to be the difficult part of the problem.

We learned that New York State had done nothing in the way of sewage disposal, except to enact legislation intended to prevent the pollution of its streams. Other states have done but little more, with the exception of Massachusetts, which is practically the pioneer in this study. She has a state experimental station, and more sewage disposal plants in operation than any other state in the Union. Our commissioners visited Boston and met the officers of the Massachusetts State Board of Health, the president of which was most courteous and gave us the freedom of their experimental station at Lawrence, arranged for us to meet several sanitary engineers, who were prominent in this work in their state, and to visit the several intermittent filtration plants which were in operation.

The experimental station at Lawrence while small, has been established for a number of years, and is under the observation of the State chemist who plans all the experiments and determines their value. This conclusion from these studies is that the septic tank is uncertain in its action and that intermittent filtration will be the scheme of the future. The latter was the view of all those whom we met who were familiar with the construction or maintenance of these various intermittent filtration beds.

We also visited New York and saw there some chemical precipitation plants in operation, and observed the construction and details of maintenance. We found the original cost of the construction of these plants very large and their cost of maintenance prohibitive for our village, due to the fact that the sludge had to be handled, when wet, whether burned or composted.

After a year's observation, we reached the following conclusions concerning the solution of our problem.

1. That our sewage was out of all proportion to the population of our village due to seepage, surface, storm, and waste tap waters, being in amount about 400 gallons per capita per diem instead of 40 gallons per capita per diem.

2. Our sewage must be reduced to a normal quantity.

3. That we would not consider broad irrigation.

4. That contact beds were yet in the experimental stage.

5. That chemical precipitation was an unsatisfactory and extravagant method.

6. That there were several intermittent filtration plants in Massachusetts being successfully operated.

7. That the disposition of the sludge was the one feature that the sanitary engineers had been trying to solve and so far had been unsuccessful.

At this time we were obliged to decide upon some method of sewage disposal for our village, and so, basing our conclusions on our practical observations and such theoretical knowledge as was available, we decided to accept that of intermittent filtration and employ Mr. F. A. Barbour, a sanitary engineer of Boston, to come to Saratoga and ascertain if the local conditions were adapted to the intermittent filtration proposition, and if possible, find an area of land that would answer our purpose. Mr. Barbour's report was particularly favorable. We then directed a second report embodying plans and specifications, which if acceptable to us, would be submitted to the State Commission of Health for its approval.

The second report made necessary the metering of our water supply, the construction of many miles of water carriers, a mile or more of trunk sewer, a pumping station and twenty-one filter beds; it also advised the construction of three retaining tanks, and an aerator.

I want to speak of the beds, Mr. Chairman, and I have some photographs which I think will make it clearer than I can explain it.

By the photographs you will see the location of the beds and the surface of the beds, both in winter and summer, and the condition of the soil, as prepared for summer and winter use, and there are one or two pictures of the process of construction; and I think they will show this to you very much more clearly than I can describe it.

An intermittent filtration plant consists of a number of beds, each bed having an area of about an acre, under the surface of which tiles are arranged to collect the effluent and conduct it to a common center. The beds are bounded by an embankment, in which the pipes and gates are located to control the distribu-

tion of the sewage. The surface of the beds is level in summer, unless crops are grown; for winter it is plowed in furrows, and when ice forms, it is permanent and the sewage flows under the ice in the channels. The sewage is allowed to flow on the beds in definite quantities and at fixed intervals. The quantity of sewage for each bed is governed by the area of the bed, the character of the soil and the interval between the doses, and by the condition of the surface and activity of the bed; the object of the interval is to allow oxygen to gain access to the soil which is essential if the best result is to be obtained in caring for tne sludge, which is deposited on the surface of the beds or in the first inch of the soil, which is laden with scavenger bacteria. The organic compounds present constitute the insoluble portion of the sewage, and are mostly nitrogenous in character. The chemical changes which occur are principally those of oxidation and nitrification—ammonia compounds, nitrites and nitrates of the alkaline bases are the principal compounds formed. While we have studied the sewage and effluent and estimated the chemical changes weekly, since the inception of our plant, as stated, I do not propose taking this study up at this time. The surface of the beds where there are no retaining tanks has to be groomed one or more times a week and the crust, or deposit, removed, otherwise the bed would become slow or clogged. I am informed that over 3,600 tons of this material have been removed from the surface of the beds at the Brocton plant during the past year. The quantity of sewage at Brocton is about the same in quantity as at Saratoga, but is a much heavier sewage. Below the surface of the beds, anaerobic bacteria thrive; these bacteria act particularly on the fats which are contained in the sewage and which are most difficult to dispose of. Thus two classes of bacteria which are present in filtration beds have to do with the results of the problem, though the results must depend upon the period of contact of the sewage with the bacteria, which in filter beds is brief, as the sewage soon leaches away.

That this, nature's method, might be increased to its greatest usefulness and so dispose of the sludge, was the ambition of our engineer, and he accordingly suggested to us the adoption of the retaining tanks and aerator, that the full bacterial action would be possible. The anaerobic bacteria will act on the sedi-

ment at the bottom of the tank, while the aerobic bacteria will be most active in the scum on the surface of the sewage.

The sewage passes out of the tanks to an aerator, where it flows in a thin sheet over rough surface of metal, not unlike an open umbrella in appearance, which breaks it up, allowing the sewage to more readily take oxygen from the atmosphere, to give activity to the aerobic bacteria while the sewage is passing through the filter beds. By actual tests we know that the sewage takes up ninety per cent. of oxygen while passing over our aerator.

As you know, the activity of all bacteria depends upon the temperature of the medium in which it exists. This was forcibly illustrated last winter as the temperature of the sewages became lower, the sludge in our tanks increased. In the spring, as the temperature of the sewage became higher there was an increased bacterial activity and the accumulated sludge of the winter months commenced to disappear, illustrating most forcibly the necessity of keeping all surface and storm waters from the sewers as these would materially lower the temperature of normal sewage.

The activity of the bacteria is also modified by antiseptics which are present in the sewage from municipalities where manufactories are present, if they use chemicals which are discharged into the sewer.

After two years of continuous observation and study the commission accepted Mr. Barbour's final report. It was approved by the State Commissioner of Health and we were ready to commence our practical work. We first reduced the quantity of sewage which was due to our original system being a mixed one, i. e., carrying sewage, seepage, surface and storm water and a very large quantity of waste water from our taps; the latter was due to defects in plumbing, and also to its use to protect plumbing in cold weather. In almost every home there was one or more taps that were allowed to run so that the water would circulate and not freeze; the poorer the construction of the house, the more freely water would be allowed to run. This complication was overcome by metering the entire water supply of our village and charging a fixed rate for each 1,000 gallons of water consumed, the construction of many miles of water carriers, the converting of certain parts of our smaller sewers, where the seepage was

great, as well as a mile or more of our trunk sewer, into water carriers did the rest. The abandoning of our old trunk sewer necessitated the construction of a new one, of a mile or more, which carries the sewage to our pumping station by gravity. Here we established three centrifugal pumps, run by electricity, working automatically and independently or together as required to raise the sewage nineteen feet, through a mile and one half of pipe into the retaining tanks at the filter beds, here it remains until the bacterial action is accomplished. We have four of these tanks, each having the capacity of 500,000 gallons. We use one or all of these tanks as required to allow the sewage to undergo bacterial action. The exact time it should remain in the tanks is a matter of continuous observation as conditions of sewage and temperature must always be considered. From these tanks the sewage flows over the aerator, then into a tank called the dosing tank which holds 50,000 gallons, the quantity usually emptied on one bed at one time. This tank has an automatic apparatus which will distribute the sewage on any one of four beds in rotation that may be selected by the caretaker.

We have in all twenty-one beds, nineteen of which are intended for the usual sewage as it leaves the tanks, while two are arranged for sludge beds when we shall have occasion to empty the retaining tanks. As yet, these beds have not been used. By measurements made twice weekly, the deposit in the bottom of the tanks and the amount of scum on top of the tanks is the same in amount as a year ago. I am speaking of the period from November 1, 1093, to November 1, 1904, when the tanks had only been used five months. Because of the bacterial action in the tanks, there has not been the slightest nuisance from the beds or aerator. As a matter of fact, these sewage beds are an added attraction to our village and many of our guests visit them and find them not only free from annoyance, but speak of them as picturesque. At the Brocton plant they do not have retaining tanks and they have had to remove 3,000 tons of compost from the surface of their beds during the past year, while we have not removed any during the whole experience of a year and a half. This fact with the automatic pumping station and dosing tank, reduces our maintenance to an unprecedentedly small figure, our

maintenance costing about $3,000 per year for one and one half million gallons per diem.

I will ask your indulgence while I itemize our maintenance for the past year from November 1, 1903, to November 1, 1904. as the maintenance of any plant is of very great moment to those contemplating the establishing of a sewage disposal plant.

One man at pumping station (half time)	$300
Electrical power of one year	750
One man in charge of filter bed	66[illegible]
Feeding and incidental expense of one horse	200
Extra labor at beds	1,500
Total	$3,410

This includes preparation of beds for winter, leveling and extra care in the spring and the removal of the snow from the sewage runways in each bed. Another year I believe the cost of extra labor will be reduced to $1,000, and now that our pumps are adjusted our bills for power will be as they have been for the last three months, about $50 per month, making a saving in the year's power at the pumps of $250. So I believe the system can be maintained for materially less than $3,000 annually.

In closing I trust the review of the experience of the commission compelled to install a sewage disposal plant at Saratoga warrants making the following conclusions:

1st. That the sewage disposal plant at Saratoga is an ideal one, for sewage not contaminated with germacides; the beds did perfect work last winter with a temperature that would average zero and for days was from 20 to 30 degrees below that point; there is no local nuisance of any kind at or near the beds. The maintenance is low and the effluent potable, the latter meeting the State's requirements.

2d. That the State Department of Health should be in a position to advise a municipality it is compelling to establish a sewage disposal plant, concerning the proper course to pursue. In other words, the State Department of Health should not only be competent to, but it should be the duty of the Department to, determine the best and most practical method for the village to adopt, thus obviating the anxiety, delay, uncertainty and ex-

pense that our commission had to experience for two years while determining the most practical method of sewage disposal for our village. The whole undertaking necessary to divert our sewage necessitated an expenditure of $200,000, with no assurance of the plant being of service to the village, other than our own conclusions. This is too much to ask of citizens unfamiliar with the technical knowledge involved.

3d. The State Department of Health should provide means either by establishing a small sewage plant, where all the essential features, both theoretical and practical, could be determined, or else make a temporary experimental station at any of the sewage disposal plants in the State, moving from one to another when all the features of a particular plant are acquired. This would naturally stimulate the head of the Department to gain a knowledge concerning all sewage disposal plants in the United States and Europe. The knowledge accumulated in this way with a chemical and practical examination of the sewage from any municipality and an examination of the local soil, should enable the State to determine and inform the city or village that which is best and most practical at a very small cost.

The local engineer could then prepare plans and specifications for such construction as was required. This would save thousands of dollars to the city or village, and to my mind, insure the installation of sewage disposal plants of a very high efficiency.

4th. I would emphasize the above statements and the urgent need of a State sanitary department to take up the study of sewage disposal by reading the discussion of Prof. Landreth's paper presented to us in 1901. At this time our Commissioner of Health, Dr. Lewis, said: "Are there any gentlemen present who wish to discuss this paper? You know dinner doesn't come until eight o'clock tonight. If there is to be no discussion—and I can understand why you do not wish to discuss this paper—it is because you don't know how to discuss it. That is the way I feel about this question of sewage disposal. I have spent considerable time in studying this question. I went with a number of others to England a few years ago with the express purpose of studying their plans and methods, and found that the same uncertainty exists there as here as to what is the best and most feasible method of disposing of sewage."

Dr. Lewis—Will Prof. Landreth please continue the discussion?

Prof. Landreth—Mr. Commissioner, I want to thank Dr. Moriarta for his very hearty and intelligent support of the question of the necessity of further study of the question of sewage disposal. If we had had Dr. Moriarta before the Governor during the past session of the Legislature, I think we might have been in a better position today, because, as you are perhaps aware, it has been the effort of the Department for several years to undertake just the line of investigation which Dr. Moriarta has called attention to, and after failing once or twice to secure the necessary bill, the Department did compass the passage of such a bill, which provided for the carrying on of investigations looking toward the improvement of our water supplies,—and sewage disposal is only another name for that; we regret to say that the necessity of economy made it apparently desirable that the bill should wait for an appropriation for another year. We hope, however, in the near future, that a more fortunate outcome may follow.

Dr. Draper, yesterday, in his remarks, said that he conceived it the duty of every medical man to take every step possible for the general amelioration of the sanitary conditions in the State. That undoubtedly is the proper and ideal idea. Unfortunately some medical men may not entertain quite the same idea, but there certainly can be no doubt that every medical man who is a sanitary officer should consider it his duty to take any and every step for the improvement of sanitation, whether in the course of his duties or not, and it clearly is one of the fruitful lines of effort to aid in the reduction of the death rate through the medium of the improved conditions of sanitation, which demand better sewage disposal for their improvement.

Our death rate from all causes during the time that the Department has been in operation (and the previous State Board of Health) eleven years, has been reduced something like ten per cent., after making a reasonable allowance for errors in population and in the number of deaths. The errors in the census will almost invariably be below the total number,—an error of omission rather than commission; and the same may be said in regard to the deaths, omission rather than commission, and therefore the ratio between the two will not be in error.

So that making allowance for that possible error, our death rate is on the decline and has been reduced during the past eleven years by about ten per cent., on all causes of death; and if you take the preventible (?) diseases (I told you two years ago they had been reduced 29 per cent., at present it is 30 per cent.), and a good deal of that has been accomplished in the prevention of diseases which are traceable directly to or have an incidental bearing on the matter of water supply, of which of course the most striking is typhoid fever, but is not the only one,—the matter of sewage disposal bears directly on that; and right here comes the moral relation of the health officer's duty to advance this matter. This matter will rarely if ever be of immediate importance for his own locality,—it will be a matter which affects the life and health of those down the stream, and unless he takes a broad view of his relation to the whole public at large, he will fail to measure the importance of his duty in regard to this question of water supply.

As an instance of that point let me say that the State has within the last year had cause to exercise its functions twice in the matter of outer State waters,—one in a requirement that a municipality in our own State should install a system of sewage disposal on a stream near the boundaries where the waters passed out of the State. That was done without consultation from outside of the State, but with due regard to the moral obligation of the State to protect the waters whether confined to the State or not.

The other instance was one in which the rules of the Department were consulted in the interest of a water supply outside the State. The question of jurisdiction was raised as to whether we had the right. The Attorney-General decided that we had the right to protect the waters of either State.

The same view of health officers should be held with regard to the protection of water supplies below their points. It will rarely be the case that sewage disposal will protect their locality, but rather somebody below; and somebody is often above us, and if we expect to be benefited, we must benefit.

Just a word as to the present state of our knowledge of the question of sewage disposal. The paper has very clearly set forth an account of one of the best systems in the country, with-

out question the best in this State, and one of the best in the country.

I would like to emphasize rather more strongly than the doctor has done the important part played in his plan by the detention or retaining tanks as he calls them. The plan of intermittent filtration, which is the oldest plan of sewage disposal, following chemical precipitation (which is a back number) the oldest plan of intermittent filtration has found its limits in the past in regard to the treatment of sludge, the accumulation of sludge on the surface, causing the rate of flow to be kept down to a very small amount and causing expense due to the removal of sludge from the surface. That has been the great drawback to the system. Efforts were early made, eight or ten years ago, to discover a means by which the rapid filtration through sand could be reduced, because it is a very heavy expense and anything that will diminish the rate of filtration diminishes the size and cost. Early efforts were directed toward increasing the rate of filtration, and seiptic tanks and other forms of improvement were undertaken, and it was finally ascertained that although the seiptic tank does not produce real purification and but little actual reduction of organic matter, it does perform a very important function and that is that it liquifies the solid matter, and takes out fifteen to twenty per cent. of the organic matter, somewhere from twenty-five to thirty. That is all that the seiptic tank does; so that considering the seiptic tank as the means of ultimate purification, it does not do it, but it does aid in the liquification of solid matter, making it possible to treat a very much larger amount of sewage per acre per day, and the doctor has invoked the seiptic tanks as preliminary treatment, and I think more credit is due to them than many people suppose. It should not be depended on, however, as the main feature, and any village or city dependent upon the seiptic tank as the only means of purification must expect to be subject to a very imperfect degree of purification.

It is true that there are cases where all you need is liquification and some stream that is well aerated,—runs for a good many miles before coming into a populous district may possibly be suited by the seiptic tank system,—in a few instances the seiptic tank may be suitable as a final treatment for sewage

disposal, and in many cases it will be a valuable preliminary in other forms of purification, and it diminishes the cost of maintenance.

Regarding the matter of aeration on the surface: That matter has been introduced in a very efficient manner at Saratoga, but that should not be depended on to too great an extent. When it is understood that the purification of sewage demands an amount of oxygen represented by about five times what water will absorb, and when you remember that about one fourth of the purification has been accomplished by the seiptic tank, leaving three fourths unfinished, and requires therefore about four saturations of oxygen, and 90 per cent. of one saturation does not give much aid, but it is some 22 per cent. of the total amount, and is a substantial aid, but it does not go very far. It takes the burden of the aeration that far from the sand surface, and permits a little better treatment; but the 90 per cent. which the doctor referred to does not mean 90 per cent. of the total amount, but 90 per cent. of one saturation(?).

I think that one municipality has gone about the determination of what is best for it in a very energetic and systematic manner, in spite of the two difficulties which Dr. Moriarta has referred to, viz: the abnormal water consumption and the mixture of the street water with the sewage; and it has solved both of those difficulties and has got after the matter of sewage disposal proper in a very effective manner; and I think the State should be congratulated that we have got such a plant in our midst, and we hope that the time will soon come when we shall be able to conduct experiments along other lines of inquiry, yet unsolved, looking towards the purification of sewage. The subject is past the experimental stage, so far as the treatment is concerned. It is purely now a financial matter,—what method will give us the best result with the least cost,—that is still unsettled.

Of course, we are constantly making progress in regard to this, but there is room for further work to be done in a systematic manner, as much as possible separated from commercial conditions; and therefore work to be done which cannot be done usually in a municipality unless they have the funds for investigation.

There is a special opportunity, therefore, for State investigation upon questions in increased commercial(?) efficiency, at

some plant now under construction or later to be built; and we should be very much gratified that the Saratoga plant is so near us that, in case the time shall ever come when we have an opportunity to do that, this plant will be within reach for investigation.

Dr. Lewis—Will Dr. C. W. Smith, health officer of Westfield, continue the discussion?

Dr. Smith—The board of health of Westfield asked me to come down and represent them. We are in the western town of the western county of the State, about 4,000 inhabitants, without any public sewers. We have several factories there, mostly grape juice manufactories. We are in the center of the grape district. There is a disposition on the part of the people conducting these factories and the larger property owners to erect and maintain some system of sewerage. We are at a loss to know how. We are only one mile south of the shore of Lake Erie and Chautauqua creek passes through our village and all the sewers that empty there are emptying into that creek and run a mile into the lake. While the factories and the manufacturing part of the village are anxious for sewers, we know that if it goes to a public vote it will be voted down and we feel that if there is any method that any person here knows today, whereby I can go back and tell our people that we have arrived at some plan whereby sewers can be built there, I would like to hear it. The smaller factories seem to be opposed to it.

We have a splendid gravity water system and we have other improvements and we want to be progressive, but we are without sewers. There is one place in particular in the rear of stores, that is a menace to health and recognized as such by every one in the town, but still we are unable to create public sentiment enough there to come out and vote for sewers. We all agree that we need them, and if there can be any plan devised I will be glad to hear it.

Dr. Lewis—The doctor has raised a very important question, I think. He brings to mind the fact that at least three towns in the State have sewer systems which have been approved, some of them as long as three or four years and the construction of which has never yet been authorized by a vote of the village.

If there is any method whereby that popular vote, participated in by people who really have no monetary interest in the expenditure, could be obviated, it would be a good thing for those towns without any sewers who want to build them and want to pay for them but cannot get the opportunity. Perhaps that is not a question to come before this conference especially.

Delegate—I am running up against the very same proposition as the gentleman who just spoke. Our plans have just been handed in and accepted by the State Board. It will probably come to a vote in March during our village election. We have blocks of stores or buildings that are simply honeycombed with cesspools, and of course on the other side of the D. & L. it is hard to tell whether they will vote it down or not. We need it on our main streets to protect the people, and I don't know what we are going to do unless we get it. I would like to go back and tell the people that we have got to have the sewers. I would like to tell them that the State Department says that we have got to have them.

Major Hitchcock—I can answer in regard to these gentlemen's cases, in part at least. I am able to assure them that there are cases in the books where the board of health has been upheld by the courts in constructing, I will not say an entire system of sewers, but a part of the system where the circumstances were such that it was a necessity in order to cause conditions which threatened the public health to cease, and in case the circumstances warrant such action as that on the part of the local board, the expense becomes a charge against the municipality, which it must meet, whether there is a vote of the taxpayers or not, under the provisions of the general law which require the necessary expenses of the board to be paid by the municipality as provided by law, and that is in the same manner that other expenses are paid by the municipality.

Now the remedy would be an extreme one and it would be necessary for a board that wished to take that action to go to work in the most careful manner. They should go to work on evidence that there is a public danger and a public necessity. They should as the next step bring that evidence, together with their findings that there was such a necessity, before the muni-

cipal body and require action on their part. Then in the event of their neglect or failure, they might, with a good degree of confidence, undertake the work themselves.

So that I do not think that even in the circumstances that these gentlemen have mentioned they are utterly without a remedy. The remedy is an extreme one but it is sufficient and if properly exercised the courts will uphold it.

Dr. Lewis—The practice of the Department so far has been that in case a village should present a system of sewers which was approved, that we would gladly permit a section of such system to be constructed, that is a small section, to serve a certain street or block, provided that it was so constructed that when completed the system would be perfect. Further than that I don't believe that we can go beyond this. Two years ago one town in the State had a sewer which needed repairs for sanitary reasons and they claimed that the village law prohibited them from expending any money until it was voted. We took the ground that they should repair it under any circumstances because it was necessary as a sanitary measure. The reply was that they hadn't any money to pay for it; so to meet that objection, last year, I had an act prepared empowering villages to borrow money under such circumstances,—where it is needed for the abatement of nuisances they have a right to borrow money for that purpose.

We shall not approve on the piecemeal system unless, when completed it would be a perfect system of sewerage. It would be poor economy for the town itself.

Delegate—I represent a town that is at present very vitally interested in the idea of sewage. We have the Great Lackawanna Steel Plant located in our town on the shores of the lake. Dr. Johnson and other of your inspectors have been there. We have about 10,000 inhabitants in about one mile square; they are Polacks, Italians and other nationalities and they don't know what sewers are for.

We have had an engineer working there all summer and I think our plan has been accepted by the State Health Commissioner.

We have not decided about our disposal plant; we don't know what we want; but I think the paper of Dr. Moriarta makes it very plain what we want. I would like to ask a few questions,—about the number of inhabitants in Saratoga and the area of Saratoga that is to be sewered and the area of the beds and also the location. Are they within the city limits or are they outside in some adjoining town, and is it built up all around these beds and are there any complaints made by the people that it is a nuisance; will it become a nuisance in the future at any time, and also could this plant be started upon in the winter time? We want to start in in the spring and I would like to get any information before that time.

Dr. Hallenbeck—We are confronted with the question of the distribution of our sewage. We have a system that is very good indeed but our town is growing and we have got nearly to the limit. We sewer into the outlet of Canandaigua lake. We have a shallow stream.

Now I ask the doctor if in his judgment a seiptic tank, constructed as he has stated, would get rid of our solid material and we could then dispose of it in our stream and thereby dispose of our sewage satisfactorily. You understand that we are now disposing of it in a fair way, but in the summer time when the water is low there is a sediment in the outlet which has come to be a nuisance and complaints are being made. We will soon have to find some other way of disposing of our sewage. If a seiptic tank should be installed, would that accomplish the desired results? I would like to ask about the construction of the seiptic tank. Is it made of steel, or what, and where is the exit, at the top or the bottom, or the middle?

Dr. Moriarta—In reply to the first question, our population is about 14,000 during the winter months, and this is increased in the summer season to 50,000. The area of the town is perhaps two miles square. Concerning the filter beds, they vary, but usually have an area of one acre each. We have 21 beds in all.

I have purposely omitted all details in my paper, as there is much to be said it would not be within the limits of a paper at this time; and also because I wanted to give you the history of the experience of our commission in reaching a conclusion, and

so suggested that Dr. Lewis should be in a position to come to our aid and advise us as to what is best to do when a sewage disposal plant is to be installed, instead of our being obliged to travel over the United States to find what was most adaptable to our purpose. As you can appreciate, it was awkward to determine concerning the adoption of a proposition for a municipality that would cost one quarter of a million dollars, when all available information is contradicted by eminent men. However, if I am not taking too much time, I shall be glad to talk about it.

As to the number of beds required, this depends entirely upon the amount of sewage and the character of the soil. Not only must you have the proper soil, but it must be uniform in quality. This condition is determined by digging a number of test pits and passing the sand thus obtained through sieves, to determine its fineness and the uniformity of its fineness. If the soil varies, so as for instance some of the soil will go through a sieve of 60 meshes to the inch, another portion at 80 and another at a 100 meshes to the inch, the efficiency of the beds is not more than the finest sand. Thus the area needed is a relative matter, and depends entirely upon the soil. This is of so much moment that we established a pumping station, with its additional expense, in order that we might have soil for our filter beds that was uniform, rather than take another area that was not so favorable on which the sewage could run by gravity. The beds in which the soil is not uniform will clog more readily and act more slowly.

Our sewage plant is located one and one-half miles from the village and not over an eighth of a mile from a much travelled road. There is no annoyance from the beds, however, and if they were immediately adjoining the road there would be none. When I say there is no annoyance, I mean that there is no nuisance emanating from the plant in any way. I would be understood in saying that there is no nuisance, that I am not comparing it with a hog yard, but rather with a well-kept truck farm. I emphasize this feature, because last winter I was over at Boston to discuss a paper on this subject before the engineers of the State, and when I mentioned the fact that there was no nuisance, many of the members present were cynical if I might

judge from the expression of their faces. As I said to them, I say to you now, using the expression of the street urchins, "we have got the goods!" I would be glad if any or all of you who are interested in this subject would come to Saratoga; it would be a pleasure to show you the features of interest.

Fifteen or twenty minutes after the sewage is allowed to flow on the bed, it has all disappeared, and there is no odor remaining. The different members of our State Board of Health who are present today have visited our plant and can verify the statement which I have made to you. We have never had a complaint of any existing nuisance from the families adjoining our sewage area; I trust this condition will continue. Sanitary engineers who are skeptical concerning the value of seiptic tanks say "wait until next year and see the predicament you will be in." However, they said that in Boston a year ago and since that we have passed through a very severe winter and are all right, and in better condition than at that time. As the temperature of the sewage falls, the sludge will increase in the tanks; and in the spring when the temperature rises again, it will diminish. This we have demonstrated by actual measurements, which we have carefully taken twice a week, both of the deposits and the scum in the seiptic tank. If we should have occasion to empty our tank, we have special beds for the purpose, and at that time I suppose it would be well to use some lime to help deodorize the contents of the beds; the atmosphere would accomplish this, however, in a very few hours, I am certain.

At Brockton they have a large retaining tank. The idea was to have the sewage accumulate to lessen the expense of pumping. So the sewage is allowed to collect there for 24 hours, and once a day it is pumped onto the beds. The unfortunate part of this scheme is that they daily pump out all the bacterial life, and the only action they get from the bacteria is when the sewage flows on to the beds and through the pipes.

In reply to Dr. Hallenbeck's question, I do not believe that the seiptic tank alone would suffice for the sewage disposal proposition at his home, unless the State Commission of Health is more lenient with his village than they were with Saratoga. The requirement of the State in this matter is that the effluent

would be potable; if this were not so, the seiptic tank would help very materially as suggested by Dr. Hallenbeck.

As to contaminated sewage, that is, where the sewage is mixed with chemicals that act as germicides, you must depend upon methods other than bacterial action. If you do not, you will be disappointed. This feature does not seem to be appreciated at all times. Prof. Kinnicut who discussed the value of the seiptic tank a year ago before the Massachusetts Society of Engineers, declared the value of the seiptic tank to be nil. He based his conclusions on the results obtained at Worcester, by studying the sewage at that place. Worcester, Mass., has a sewage which is more heavily loaded with chemicals from their manufacturing interests than any other city in the United States. This factor produces a condition inimical to bacterial life.

This, however, is only one of the many features that must be studied in the future. To my mind, the question of the disposition of normal sewage has been solved.

Dr. Lewis—I wish that the suggestion made by Dr. Moriarta, that you all visit, as soon as you have an opportunity, the disposal works of Saratoga, might be adopted. It is the most interesting and complete system that I have ever seen, although I have seen nearly all the sewage disposal works in Great Britain and some other countries. It is a most beautiful arrangement for the treatment of sewage.

One more word: This question which has been raised by Dr. Smith will be carefully considered by us and any steps which may seem advisable for obviating the difficulties which he suggests will certainly be promoted by this Department as far as it is able. If any of you have this question under consideration and have any suggestions which can be used in promoting legislation by way of amending the Village Law or the Public Health Law, or both, we would be very grateful to you if you would let us have the suggestions.

Dr. Smith—I wish to ask Major Hitchcock if he could turn to those decisions or cases where I understood him to say the boards had taken the matter in their own hands and acted. If I understood him properly, there were cases where they had taken it into their own hands and acted; and if that has met with the approval of the courts, I would be very glad to learn it.

Major Hitchcock—I have those memoranda upon briefs at home, but not so that I could inform the gentleman at present.

Dr. Lewis—That procedure is defined in the Public Health Law, in one of the sections, and within my knowledge it has never been acted upon since the present Department was organized.

Dr. Moriarta—I don't understand that the State Commissioner or the State Board of Health can condemn the premises as being a nuisance,—we didn't have to take any vote. We were compelled to. There were some neighbors annoyed with some nuisance that we were maintaining and they brought proceedings for an injunction and the Governor granted it and we were just given a year to get out. There was no question of voting, it was mandatory.

I do not see why if the State Board of Health condemned a certain locality as a nuisance, it is not up to the board to correct it.

Dr. Lewis—But let me remind you that the order upon which you were compelled to act was an order issued by the Governor, under an investigation ordered by him. Under the Public Health Law that constitutes an entirely different proposition and it is mandatory,—if he orders an investigation and we carry it out and make our report to the Governor and he issues an order, that order has all the force of a command and must be complied with.

Dr. Moriarta—Is not that a way?

Dr. Lewis—Unfortunately the State Commissioner of Health has not so much authority.

Dr. Moriarta—Could not some one who was interested cause that investigation to be made?

Dr. Lewis.—Possibly. Such complaints go to the Governor and if he turns them over to us for investigation of course such an investigation is made.

Dr. Johnson—I should like to offer a resolution for a vote of thanks to Major Hitchcock for his able and instructive paper on the subject of the procedure in sanitary work, the legal methods and forms of procedure in sanitary work.

The resolution was unanimously adopted, and the conference adjourned till 2.30 p. m.

AFTERNOON SESSION, FRIDAY, DECEMBER 16, 1904, 3 p. m.

Dr. Lewis—The first work of the afternoon will be a paper by Dr. Pease.

STREPTOCOCCIC AND ANTISTREPTOCOCCIC SERUM.

By HERBERT D. PEASE, DIRECTOR ANTITOXIN LABORATORY, NEW YORK STATE DEPARTMENT OF HEALTH, ALBANY, N. Y.

Among the very first bacteria found associated with pathologic conditions in man, were round or slightly oval forms, growing in chains of various lengths, which were designated streptococci. The conditions with which they were early known to be associated were erysipelas and other spreading inflammations with or without suppuration; local suppurating inflammations, such as abscesses, boils and furnucles fibrinous inflammation of the serous and mucous membranes; and also general septicaemia and pyaemias.

In the early eighties streptococci were found in cases of scarlet fever, chiefly in the mucous membrane of the throat, and also in the blood, and internal organs in fatal cases a few years later.

In the early nineties streptococci were first found in the circulating blood in a limited proportion of the cases of scarlet fever examined for them during life.

More recently Hekteon has made an extensive study by means of blood cultures taken during the life of 100 cases of scarlet fever. From 12 of these cases cultures of streptococci were obtained. Of these four were from mild cases, five from moderately severe, and three from severe. The day of the disease on which these 12 successful cultures were obtained varied from the first to the seventh.

Jochmann has also investigated the presence of streptococci in cases of scarlet fever during life and at autopsy. In 161 cases in which the blood during life was examined he found streptococci in 25, nine of these 25 cultures were obtained in the first week, and the others in the second to the fifth week of the disease—(the pneumococcus twice, and a paratyphoid bacillus once). He never found streptococci in the circulating blood during the height of the fever; that is, on the first two days of the disease..

At 66 autopsies streptococci were cultivated from the heart's blood in 50 cases, while 16 were sterile. The bone marrow of 14 out of the 16 cases, the spleen in 45 cases out of 65, and the kidneys in 35 out of 54 cases also contained streptococci.

Although these investigations indicate the great improbability that streptococci have any ėtiological relationship to scarlet fever and they fairly represent the results of the majority of such examinations, there are still some workers who maintain that such an etiological relationship does exist.

Within the past few years streptococci have been found in the circulating blood in cases of smallpox, although their presence, both in the blood and skin lesions, in a large proportion at least of the cases coming to autopsy, has been known for a longer period.

Ewing* cultivated streptococci for the heart's blood in all of the 29 fatal cases, and also in the skin lesions in 90%. In five living patients cultures made from the circulating blood were entirely negative.

Perkins and Pay† cultivated streptococci from the heart's blood and organs of 38 out of 40 fatal cases examined. From the circulating blood of living cases they obtained cultures of streptococci in 54% of 20 cases. An important point brought out by them is that they were able during life to cultivate streptococci from the skin lesions in but two instances out of the 30 cases, but were able to readily cultivate them from this location very soon after death.

The cases not showing streptococci, generally belong to three clinical groups, the purpuric, secondary hemorrhagic cases, and those with varioloid. Those generally infected with these bacteria were the confluent cases. These authors determined that the pustulation of the skin lesions did not depend on streptococci.

In general it may be said that the streptococci make their widespread appearance throughout the body late in the disease, and in severe cases. They are not present during the life of all severe cases.

From these results it can safely be concluded that streptococcus in cases of variola is altogether secondary to the main disease.

*Proceedings N. Y. Path. Soc., May, Vol. II, § 4.

†Journal of Medical Research, 1903, Vol X, § 2.

Recently streptococci have been isolated from the affected tissues in fatal cases of acute articular rheumatism, and they are believed by some bacteriologists to be the etiological agent in this disease, although other investigators have isolated what is claimed to be a different micrococcus from such cases, and claim for it a causative relation to the disease.

For the specific inflammatory and suppurative conditions there is a general unanimity of opinion that when a streptococcus is found associated with any one of these conditions it bears an etiological relationship to it. There are, however, other species of bacteria which may in other cases bear this same relationship to any of the diseases of this class.

Early in the history of these findings concerning streptococci, the question arose as to whether these micro-organisms associated with the various diseases belonged to the same or different species. This question is of the greatest importance, for the development of a successful serum treatment of streptococcus infections depends, in a large degree at least, upon its settlement.

Fehleisen who first isolated and determined the etiological relationship of streptococci to erysipelas, maintained for many years that the streptococcus from this disease was not the regular streptococcus pyogenes found in other pathological lesions but a distinct species. In this he was strongly supported by Rosenback and others.

Lingelsheim, Kurth and others determined by studying the morphological and biological characters of the streptococci, isolated from different sources, differences, such as the length of the chains of cocci, and the clouding or nonclouding of bouillon cultures, which they believed would warrant a classification of these bacteria into one or more species. These differences were soon shown to be unstable and variable under altered environment, and it is generally conceded that as yet there have not been discovered any stable and certain morphological variations which permit of a classification of streptococci into species on this basis.

In the earlier days Petruschky and others showed that as far as the streptococci from inflammatory diseases were concerned, the classification of these micro-organisms on the basis of the

diseases from which they were obtained rested on a most insecure foundation, inasmuch as they were able to reproduce with single strains of streptococci such varying conditions as erysipelas, phlegmonous inflammation and septicaemia, both in man and animals.

The clinical experiences of preantiseptic days also furnish the best of evidence that infections resulting in suppurative and septicaemic conditions were very generally produced by contact with cases of erysipelas, indicating a ready transition in the character of the pathological conditions which these streptococci produced.

It became clearly evident, therefore, that the instability and variability manifested in the morphology and biological characteristics of a streptococcus were likewise in evidence in its pathogenic activities. New and more delicate methods for the elucidation of the problems involved were clearly necessary, and it can be truthfully said that most every method known to the biological worker, bearing any possibility of aiding in the solution of the matter, has been tried and as will be seen later without any great measure of success as yet.

When through the work of Gruber, Dunham, Widal and others it became known that an agglutination or clumping of bacteria would take place under certain conditions such as the mixing with them of dilutions of either the serum of patients suffering from infection with that organism, or dilutions of the serum of animals artificially immunized against these organisms, studies were soon made on the agglutination of streptococci, both by the immune serums of animals and the serum of cases of those diseases in which streptococci had been found to be more or less regularly associated.

A detailed recital of the work done on the agglutination of streptococci would involve the consideration of the development of our knowledge of the principles underlying the causation of agglutination reactions in general, and our information in this direction is as yet anything but complete or satisfactory.

Some of the difficulties which surround the application, and tend to destroy the accuracy, of agglutination tests for the determination of the etiological relationship between a given bacterium and the disease suspected of being produced by it, have

been found to be brought about by the variations in such factors as the following: The reaction of the culture media used for the growth of the bacteria tested, an alkaline reaction favoring agglutination, and an acid preventing it; peculiarities in individual cultures, such as a tendency to conglomerate condition of the chains in its normal growth which renders it more easily agglutinated, and the further property in nonvirulent cultures of an ease of agglutination not present in the virulent which has been shown to exist by Neufeld* and Aronson.† These investigators have shown that the repeated transplantation of streptococcus cultures through a series of animals like mice and rabbits, while increasing the virulence of those cultures for those animals reduced their agglutinins to a very low point, and at the same time materially altered the agglutinating power of the serum of an animal immunized by such virulent cultures. The conclusions arrived at by the earlier workers using this method, of whom Aronson himself was one, were therefore, erroneous, and the general statement can be made that in the use of the serums of artificially immunized animals for agglutination work, differences are brought about by the previous treatment of the culture used in the immunizing process.

While these complicating factors exist inherently in cultures, there are others of similar character associated with the serum tested for agglutinating power, which give rise to even more serious complications.

It has long been known that the serums of a variable number of perfectly normal human beings, and of many normal animals, are capable of causing the agglutination of some bacteria, even in moderately high dilutions. It has also been shown that the serum of an infected person varies in its agglutinating power towards the infective bacteria at different periods of the disease; furthermore that the serum of an infected person is frequently, and to a variable degree, capable of agglutinating varieties of bacteria closely related to the infecting organism. Thus Park and Collins have recently shown that the injection of animals with a given variety of the dysentery bacillus gives rise to an immune serum, from which they were able to separate a specific

* Zeitschrift für Hygiene, 1903, Band XLIV, Heft 2.
† Deutsche Med. Wochenschrift, 1903, No. 25 S. 439.

agglutinin for that bacillus from another agglutinin for other varieties of this group of bacteria, which they call the common or group agglutinin. More than this they observed that the relative amounts of these two agglutinins in the serum varied during the course of the treatment of the animal.

This knowledge of the limitations of agglutination reactions in general goes far toward explaining the very divergent results and the antagonistic conclusions arrived at by the workers on the agglutination of the streptococci. Time will not permit of even an outline of all the work done in this direction and reference will be made to the work of but a few investigators.*

Meyer† concluded from agglutination tests made with the serum of a horse immunized with a streptococci, cultivated from the throats of cases of scarlet fever, rheumatism, simple angina, erysipelas and septic processes that there exist two groups of this microörganism. One including the streptococci of anginas and the other those of the septic processes. Even the former group, he believes, could be subdivided and states that in general his work speaks against the unity of streptococci.

Aronson‡ on the other hand found that several immune serums prepared by the injection of animals with streptococcus cultures, isolated from cases of scarlet fever, septicaemia and rheumatism, were entirely lacking in a harmonious specific agglutinating reaction on streptococci isolated from cases of the same disease. Thus a serum prepared by the injection of animals with a streptococcus from scarlet fever agglutinated the organism used to produce it, but also failed to agglutinate another scarlatinal streptococcus, which was, however, agglutined by the serum prepared by the streptococcus of septicaemia. Aronson concluded that it is as yet impossible to differentiate streptococci by agglutination tests.

Of the work of testing the agglutinating power of the serum of scarlet fever patients on streptococci obtained from cases of this and other diseases but a few references need be made.

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* For a more detailed review of the literature on this subject consult: Agglutination of Streptococci, etc., George W. Weaver; The Journal of Infectious Diseases, Vol. I, No. 1. Also, Existe– T–il Un ou Pleusiers Streptocoques? A. Besredka Bulletin L'Institut Pasteur, Tome II, No. 16 and No. 17.

† Deutsche Medicinische Wochenschrift, 1902. No. 42.

‡ Loc. cit.

Moser* assisted by Pirquet, reports obtaining agglutination reactions (in low dilutions), between the serums of cases of scarlatina used on cultures of streptococci obtained from the heart's blood, in one half of the cases which he tested. The serums of normal children caused clumping of the culture in three of the 28 cases examined. More recently the same investigators† report a more extensive investigation on 45 cases of scarlatina, making 51 tests. Distinct agglutinations were observed in low dilutions (1:8) in 54 per cent. of the tests, but in a large number the reaction was not complete. For control experiments the serums from 10 placentas and from 18 children suffering from various diseases were tested. Of these three gave positive agglutination reactions; five, traces of reactions, and the rest were negative.

The work of the only other investigator which I will quote, was carried out with a full knowledge of the pitfalls surrounding the making of such tests, and the work was most thoroughly controlled. Weaver tested the serums from 21 cases of scarlatina; seventeen from pneumonia; four from erysipelas, and 16 from other diseases, or normal individuals upon streptococci obtained from various diseases. In these tests, 11 cultures obtained from cases of scarlet fever were used. Of these some were agglutinated by nearly all the scarlatinal serums at varying dilutions. Others were agglutinated less constantly and many were not agglutinated at all.

What is of the most importance, however, is that the same general results were obtained by the use of the pneumonia and erysipelas serums and with the scarlatinal serums. Weaver concludes that the agglutination reactions between scarlatinal streptococci and the serum from cases of that disease are not specific.

Concerning the identity, or nonidentity, of the streptococci cultivated from cases of smallpox, Perkins and Pay‡ report certain constant cultural peculiarities and unqualed pathogenic properties in many of the 22 cultures obtained by them from cases of this disease. None of these cultures were agglutinated by

*Wien. klin. Woch. 1902, No. 15, 1086.

†Centralblatt für Bakteriologie Erste Abt. Orig., 1903, Bd. XXXIV, S. 560. 714.

‡ Journal of Medical Research, 1903, Vol. X, No. 2.

an antistreptococcic serum which was capable of agglutinating the organism used in its preparation.

The conclusion would appear to be warranted that work on the agglutination of streptococci has been most unsatisfactory, not only in the direction of clearing up the problems of the unity or multiplicity of species, but also in the attempted demonstration of an etiological relationship between these bacteria and certain specific diseases, especially scarlet fever.

Various other attempts to establish a satisfactory method of differentiating streptococci into groups, or to associate them with various diseases have been made.

Some years ago Marmorek* and Schottmuller† claimed that they were able to differentiate between streptococci by the presence or absence of a dissolving action on red blood corpuscles. They claimed that this hemolytic power existed in proportion to the virulence of a given culture. On the other hand Schlesinger‡ while not denying the fact that in a general way hemolytic power is present in proportion to the virulence of the culture, has observed many exceptions to this rule.

Rieke§ ends a critical analysis of Schottmuller's work by concluding that this method does not suffice to differentiate between varieties of streptococci.

A modification of this attempted method of differentiation of streptococci has been made by Besredka¶ in which he utilizes the power possessed by the serum of an animal immunized with a given streptococcus, of fixing or rendering void under prescribed conditions the hemolytic property of the latter. By the use of this method, however, he did not obtain wholly uniform or satisfactory results.

Assisted by Dopter** he also found that the serum of scarlet fever patients did not possess in any case this specific fixing power over streptococci isolated from scarlatinal cases.

One of the important methods of differentiating species of bacteria remains to be considered. If we were given a culture of a bacillus resembling the diphtheria bacillus in its morpho-

* Annals de L'Institut Pasteur, 1895, July 1.
† Munch Med. Wochenschr, 1903, No. 20 and No. 21.
‡ Zeit. für Hygiene, 1903, Bd. XLIV, Heft. 3.
§ Centralblatt für Bakteriologie Erst Abt. Orig. 1904, XXXVI, 3.
¶ Annals de L'Institut Pasteur, 1904, XVIII, No. 6.
** Ibid.

logical and biological characteristics so closely that it could not be differentiated by such comparative tests, a sure test would be to learn whether diphtheria antitoxin when mixed with it, or its toxin, would protect animals which would certainly die if the culture or toxin were injected without the serum. Such tests have of course, been made on a large number of cultures of streptococci by utilizing antistreptococci serums produced by the injection of animals with the same or other cultures of streptococci.

Time will not permit me to consider the results and claims of more than one or two investigators in this field. Before considering these results it will be well to keep in mind that in order to apply such tests on streptococci the latter must be virulent for the animals selected as the testing basis, in order to show the presence or absence of the various protecting power of the serums. It is also well known that but few streptococci isolated from the diseased tissues of man are virulent for the usual experimental animals even when freshly isolated, and but very rarely after much cultivation in the laboratory. These facts have led many workers to either artificially increase the virulence of the cultures, which they have used for producing immune serums by frequently transplanting them from the animal to the animal of the same species, or to utilize for the immunization of the large animals cultures naturally pathogenic for small experimental animals.

Sommerfeld* made a series of tests on experimental animals of the serums prepared by Aronson, Tavel, Roux and Moser. He found that the serums best protected mice from one or more fatal doses of streptococci in the following order: Aronson's, Moser's, Tavel's and Roux's. All of the streptococcus cultures used in these tests were those that had been rendered virulent for mice by repeated transplantations from animal to animal, and it is special that Aronson's serum which was the only one prepared with cultures rendered virulent for mice in this way, gave the best protection against this virulent streptococci.

Besredka claims that whenever streptococci made virulent by passage through animals are used to produce an immune serum, and this serum is used for testing other streptococci made virulent

* Centralblatt für Bakteriologie Erst. Abt. Orig. 1903, XXXIII, No. 9.

in the same manner, that in reality the original properties of the latter have been lost and that these streptococci become unified. The tests of Sommerfeld are subject to this apparently well founded criticism. In fact Aronson found that one streptococcus naturally virulent for mice was not affected in its original state by the serum produced by the artificially virulent culture, but after it had been transplanted from mouse to mouse the serum did protect an animal against it.

These facts have led many of the producers of anti-streptococci serum for immune diseases to use for the immunization of animals only such varieties of streptococci as have been obtained from individuals, and without their passage through animals. These men further claim that the curative value of such serums in streptococcus infection cannot be estimated on experimental animals for the same reasons. One of the producers of this group of workers (Moser), believing that the streptococci isolated from the blood of scarlet fever cases are peculiar to that disease, utilizes only cultures of these streptococci in the preparation of a serum for use in that disease. The members of this group of workers also make use of many cultures obtained from human beings in their immunization of animals on account of the uncertainty of all such cultures having the same properties. Such preparations are known as "polyvalent" immune serums in contra-distinction to the univalent serum prepared with the artificially virulent cultures like Aronson's.

As is well known all these various antistreptococcic serums have been put to the test of use in cases of disease in man. It will be manifestly impossible to review even a small part of the reports on such clinical tests and a very few must suffice.

In passing judgment upon the following results it should be taken into consideration that in but a limited number of cases were the physicians using the serum, able to speak definitely as to the presence of streptococci in the lesions in the patients treated.

The antistreptococcic serum produced under Aronson's direction belongs to the type of immune serums obtained by the treatment of horses with cultures obtained from human diseases and rendered virulent to experimental animals by the transplantation from animal to animal.

It has been tested clinically by Meyers,* as well as by a host of others. In all he administered it to eighteen patients suffering from erysipelas, tonsilitis, puerperal fever, peritonitis, scarlatinal rheumatism and general sepsis. Five of these cases were much benefited, two received doubtful benefit, and in the other eleven there was no noticeable effect.

Baginsky** believing that streptococci have an etiological relationship to scarlet fever used Aronson's serum in the King Frederick Hospital for Children, in Berlin, on 63 cases of scarlet fever, of these nine died generally from sepsis, giving a fatality of 14.3 per cent. The death rate in this hospital in scarlet fever in ten years had varied from 34 per cent. to 12 per cent. The cases he tested were severe ones in his opinion, and he believes the injections of the serum did much good. Their effect on the clinical symptoms was very marked. A close analysis of the figures demonstrates that the death rate in the injected cases was 11 per cent., and of the not injected was 17 per cent.

The antistreptococcic serum used by Menzer and others in the treatment of septicaemia and acute and chronic rheumatism is produced according to the method advocated by Tavel. His serum is obtained by the immunization of horses with many cultures of streptococci all isolated from diseases in man, and not artificially enhanced in virulence.

Menzer† claims that such antistreptococcic serum produces the best results in its early use in cases of acute streptococcemia, and the results in chronic streptococcic infections are hopeful. He also endeavors to show that by the use of this serum in cases of acute rheumatism the patients stood a better chance of ultimate recovery then when it was not used. In 47 cases, 25 were healthy during one year, one had a recurrence, and 21 were lost sight of.

Schmidt‡ used the Menzer serum in 15 cases. Of these six were benefited, four obtained doubtful relief, and five were not relieved. The author considers that the serum does not have a specific action as has antitoxin in diphtheria. He obtained the best results in subacute cases, but little effect in the acute, and none in the chronic.

* Zeit für diatet. und physikal. Therap., 1903, No. 32.
** Berliner klinische Wochenschrift, 1902, Nos. 48 and 49.
† Munch Med. Wochen. 1903, No. 25 und No. 26, also,
Munch Med. Wochen. 1904, No. 33.
‡ Berliner Klin. Wochenschrift, 1903, No. 49, 1117.

The results of the use of antistreptococcic serum in rheumatism have not been therefore very promising.

Without question the best and most striking results yet reported from the use of antistreptococcic serum in any disease have been those published by Moser, and a group of Austrian investigators, in the treatment of scarlet fever by the use of the Moser-Paltauf serum. This serum is prepared by the immunization of horses with streptococcus cultures obtained from the heart's blood of fatal cases of scarlet fever. These cultures are used when freshly isolated and without any artificial enhancement of their virulence. A mixture of many cultures is used to inject the horses. The dose of the serum recommended is 200 cubic centimeters and should be given early. As the results obtained from its use, so far as yet reported, are uniform, I will refer only to the report of Escherich at the International Medical Congress at Madrid on the subject.

Escherich* states that Moser was led to take up this work by finding of streptococci in the heart's blood of so many fatal cases of scarlet fever, even in those dying early and without complications. He first used Marmorek's serum but obtained unsatisfactory results clinically. In all he reported 142 cases treated with Moser's serum. The effect on the clinical symptoms comes on rapidly within four to twelve hours. It consists in the relief of all the symptoms without shock or collapse. The temperature falls, also the frequency of the pulse, and respiration and the nervous symptoms subside. The serum must be given early before, or not later than the height of the temperature and specific symptoms of the disease. Only when given early does the serum have any effect on the septic infectious symptoms which usually follow the acute poisoning. The same holds true of the effect of the serum injections on the sequlæ such as otitis media, endocarditis, nephritis, etc. These are not prevented nor influenced if the serum is not given very early in the disease.

Escherich gives figures showing a diminished death rate in the St. Anna-Kinderspital of from over 12 per cent. before the introduction to 9 per cent., and 6 per cent. after the introduction of the Moser serum.

Escherich believes the serum acts as a true antitoxic agent on account of the rapidity of its effect on the toxic symptoms. A few control tests with normal and another antistreptococcic

* Escherich Wiener klinische Wochenschrift, 1903, No. 23.

serum have been reported but they did not give the same strikingly favorable results.

Moser also claims that the serum has prophylactic properties.

It is as yet too early to decide as to the permanent value of these observations, notwithstanding their apparently favorable outlook. It must not be forgotten that, as we have already seen the majority of observations have not shown streptococci to be present in the blood and tissues of much over the majority of the fatal cases, and in the circulation of but a small fraction of all patients. We must also remember that streptococci are not found in the circulating blood during the first two days of the disease in but very few cases. Furthermore also, the blood serum of scarlet fever cases has no agglutinating effect on the streptococci isolated from the heart's blood of such patients.

We must not forget that in streptococcus infections we are not dealing with a strictly toxic disease like diphtheria and tetanus. When found at all, the presence of the bacteria throughout the effected tissue, or the whole body, would seem to be demonstrated by the positive results of blood cultures taken during life. No soluble toxin in any appreciable amount has ever been obtained artificially from cultures of streptococci.*

It would seem therefore proper to conclude that streptococcus infections belong to the group of infectious diseases which are septicaemia in character, and for the serum therapy of these we must produce and use what we may term bactericidal or anti-infectious serums.

The studies of Bordet, Ehrlich and others, on the problems connected with the action of such serums on the bacteria used to produce them, show that in these serums there must be for effective bactericidal action two bodies. One known as the immune body is practically new to the serum, having been produced by the immunizing process, while the second body, or complement, is an element or property inherent and natural to the serum. The former body is stable, while the latter is more or less unstable. Also the complement of a given animal is not known to have the same affinity for the immune bodies of other animals that it has for those of its own species. There is there-

* For a review on this subject see Simon, Central. für Bakteriologie, Erst. Abt., 1904, XXXV, S. 308 und 440.

fore, a grave question whether we could expect, according to theoretical knowledge, that streptococcus immune bodies of the horse would permit the action by the human complement upon the streptococcus in the human lesions. While the whole problem can be stated in broad terms to be a question between susceptibility of the individual on the one hand, and the virulence of the bacterium on the other, the detailed aspects of it are most complex.

Wadsworth in his studies on experimental pneumoccus infections has shown that very great changes in the appearance of an infection can be brought about by various artificial alterations in the relation of these two forces, susceptibility and virulence.

After the numerous failures of previous investigators he has at last been able to produce experimentally lobar pneumonia in animals. This he accomplished by adjusting the susceptibility of the animal on the one hand to the virulence of the culture on the other by first injecting the animal with pneumococcus immune serum and then selecting a culture of known virulence. In this way he was able to balance one force against the other in such a way as would bring about the form of pneumoccus infection which he desired.

Undoubtedly some such relation between these forces operates in the determination of the various special forms of streptococcus infections, but the method of manipulation of them is not as yet worked out even for animals, and even when worked out how much more difficult will it be to control those conditions in the human subject.

Undoubtedly however, the great complexity of the situation will disappear in direct proportion as our knowledge of the laws operating in such matters increases and when these laws become evident we will all marvel at the simplicity of what now in our ignorance seems so complex.

Dr. Johnson—The matter now under discussion is Dr. Pease's paper, and if any of the gentlemen here have anything to say upon the subject, we will be glad to hear it. I did not have the pleasure of hearing it, but the subject is one of great interest, and one which I have no doubt you are all thoroughly posted on, and especially that which pertains to antitoxin. Is there any gentleman who desires to discuss this paper of Dr. Pease's.

Dr. Greene—Mr. Chairman, I did not hear all of the paper, I regret to say, having received a telegram, which required an immediate answer, but I think this is something of so much importance that it should be discussed quite thoroughly. We find streptococcic, bacteria or organisms in milk, especially; but it does not always mean that we are going to have an organism which is going to cause trouble, any more than the colon baccillus which we always have in milk, and it does not cause disease.

Most people, (speaking of milk), the laity consider milk as something that is generally pure, something that is always right, as long as the cow is healthy; and as all of us probably know, especially Dr. Goler, of Rochester, who has made a special study of the sanitary rules as regards milk,—that milk as a rule is something that ought not to enter the households of people in cities; and I thought, before coming down, that I would perhaps have something to say this year on milk. That is another matter of education,—that people should not take milk unless it is absolutely right.

We were just talking about certified milk. That means, according to the new State law, that it must contain no antiseptics or preservatives and no bacteria in excess, and must be so certified by a competent person. There is a suit now pending for $15,000 for a man selling milk as certified milk without its being certified to in that particular; but the point I want to make is that we may find streptococcic organisms in milk without its doing any harm. There are so many conditions to meet that it does not always mean that we are going to get disease, any more than the colon bacillus in milk means that we are going to get disease.

Dr. Goler—I hardly feel that this paper ought to be passed by. Of course, it is of so highly technical a character that one must necessarily, in order to understand it, take two or three hours (that is only a small length of time for such a paper as this); and I only regret that it is so long before these proceedings come to us that we really lose touch with the technical character of the papers that are read before the convention.

With reference to the subject-matter of the paper, I do not want to discuss it, because I am not able to do so, but I feel that there is one point that I might say something about.

The doctor has told us that these streptococci are organisms that perhaps occur as associated organisms of other diseases. In the epidemic of smallpox which we had in Rochester some time ago, the streptococcus caused us a great deal of trouble. We found that our nurses and physicians and employees in the hospital were becoming infected with streptococcic infection. All of the physicians, myself included, had an attack during the epidemic of smallpox.

The patients were taken with chills and fever, sore throat, and many of the associated symptoms which come on in streptococcus infection, and were sick for several days, acutely ill, temperature 103 and 104. I suppose this streptococcus infection came on because we were dealing not only with large numbers of cases of smallpox, but in many cases in which there were a great many pus organisms associated we had analyses made of several of those cases, and we found streptococcus associated with the disease. Our nurses would have great phlegmons come upon the face, where perhaps they had picked the face with an infected finger; and this was interesting showing the association of streptococcus infection with smallpox; and too, I think the same thing might have been found in scarlet fever.

Dr. Johnson—Is there any other gentleman who desires to speak upon this subject? Dr. Pease, do you desire to say anything more?

Dr. Pease—Concerning the remarks of Dr. Greene, he brings out a point which I did not speak of in my paper, and that is that there are, of course, a great many streptococci which are not virulent for man and yet may be for animals. It often is the case that in milk a streptococcus infection of the udder of the cow exists, and large number of streptococci pass into the milk. Such streptococci are virulent for the cow, but in a considerable proportion of the cases are not virulent for man. However, the balance between the susceptibility of an individual and the pathogenic power of the germ is so delicate in many cases that it often occurs that children taking the milk which comes from a cow with a diseased udder will be affected; and the child of one of the most prominent bacteriologists in America recently exhibited just such a delicate balance between these two forces. The child

had a violent attack of diarrhœa following the drinking of supposedly good milk which had been so heated that the streptococci in the milk had developed to an enormous number.

And that brings out just the point I desired to make: That the whole question of infection, especially in diseases of the character of streptococcus infection, is merely a question of susceptibility and virulence.

Concerning Dr. Goler's desire to receive early, papers such as I have had the pleasure of reading this afternoon, I may say that the paper will be published within a very short time, and I shall be very glad to send reprints to the gentlemen who have registered, and along with it I will forward a paper or two on other subjects which were presented at the last conference.

Dr. Goler spoke about streptococcic infections which followed treatment of the cases of smallpox in his city hospitals; but there were several features which he did not speak of, but which appealed to me immediately; and one was that, although the streptococci present in those cases were present in cases of smallpox, the persons infected did not have smallpox, but plain streptococcus infections, and that they were not all of one character. He spoke of sore throats and of phlegmons and of abscesses; and it only indicates that the streptococcus is capable of producing more than one form of infection. His experience simply demonstrates the conclusion which I made, that the streptococcus in cases of variola is entirely secondary to the smallpox, and has no relation whatever to the etiology of smallpox itself.

Dr. Phillips—While Dr. Greene was speaking of milk, it reminded me of a little circumstance which occurred at our place. We have a milk station at Morristown and the milk is sent to New York, and I have been instructed by our local board to examine carefully into the condition of the milk that is shipped to New York. In four cases I have found it necessary to forbid the milk going into the city,—being transported from Morristown to New York,—where the udder of the cow was in a diseased condition, so much so that the milkers contracted the sores on their hands in a severe form; and of course I was sustained by the board of health of our village.

But the question was left just in this way: "You are going to Albany and we wish you would inquire particularly into that question,—whether it is proper and right for you to forbid milk of that character going into the city of New York, for consumption there, in that condition?"

Now that is a question, to me, that is of very great importance, and one that we wish to receive all the information possible upon.

Delegate—Right along that line, I might say that we had a similar condition exist in Niagara Falls under my predecessor, Dr. Leo Wolff. Two years ago this coming February, an epidemic of scarlet fever broke out in our city, which was very serious, and it was found that a large portion of the primary cases, in fact I think about forty, occurred on the route of one particular milkman, and the gentleman who was then health officer conducted an investigation. He found that this particular milkman was taking milk from a farmer down in the country who had a cow with a diseased udder, and it was assumed, probably, that this diseased udder was the cause of the trouble with the milk,—that is, that it was streptococcic infection; at least I do not think that he had any examination made of the milk, to see whether it was infected with streptococci, or not; but the sale of milk was stopped from this particular farm, and after a time the epidemic abated. I am uninformed as to all the facts, but the matter came to my attention, and as the doctor spoke of this condition, I recalled the fact, and I thought it was worth mentioning before this body.

Delegate—Perhaps I can throw a little light on this subject. Regarding the purity of milk and the diseases of cattle, that comes under the head of the Department of Agriculture, under Mr. Wieting, and in nearly all the cities where we license the milk dealers, it is got at in this way—that no license shall be granted to a man to sell milk except upon the presentation of a certificate from some competent and qualified veterinary surgeon, who has made an examination in reference to the health of the cows where this quantity of milk is obtained.

Now, in Dunkirk, the licenses were withheld,—the milk dealers declined to take out licenses and pay for them, and the owners of dairies declined to have the cattle examined, with the result that the milk dealers were stopped from selling milk until they

should take out the licenses. Veterinarians were employed and the cattle were examined, licenses were granted, and the thing went along smoothly.

There was an epidemic two years ago this winter of typhoid fever, which was traced directly to some herds of cattle that were supplying milk to the city, which was being peddled. Those cattle were examined and some of them killed by order of the Department of Agriculture, and since then it is working all smoothly.

Dr. Goler—If I may just say a word: This discussion upon milk is very interesting, but the paper is "Anti-Streptococcic Serums," and we are getting into the order of the women's societies.

Dr. Greene—I will apologize.

Dr. Johnson—If there is nothing more to say on this subject, we will pass on to the paper "Experience with Two Cases of Tetanus," by Dr. John Edwards, health officer of Gloversville.

EXPERIENCE WITH TWO CASES OF TETANUS.

By Dr. John Edwards, Health Officer of Gloversville.

Mr. Commissioner, Ladies and Gentlemen:—There are duties in life from which no man can assume to himself the right to shrink, with whatever degree of diffidence or incapacity they may be undertaken. With this duteous and self-mistrustful spirit I venture to report to you my experience with two cases of tetanus.

I received a notice from the Commissioner of Health, Dr. Lewis, saying that he would furnish me with a supply of tetanus antitoxin if I so desired. In view of the fact that there were seventeen cases of tetanus in the summer of 1903 as a result of the celebration of the Fourth of July outside of the cities of New York, Buffalo, Yonkers and Albany, at my request Dr. Lewis sent me the supply I desired. Through the press I announced to the physicians of our city that I would supply them with the tetanus antitoxin in case they had any cases that would require its use and that I was fully equipped for such cases.

Two cases were sent me and five others came to me for care and treatment. In these seven cases I gave ten cubic centimeters of tetanus antitoxin and there were no symptoms of tetanus thereafter.

I wish to state that after using this tetanus antitoxin in these seven cases there was an enythematous eruption which was treated topically by peroxide of hydrogen, saleratus water, calomel and rochelle salts given internally, which is what all allopathic physicians give them.

On the afternoon of July 4 I received a telephone message to visit a young man fifteen years of age who had been injured as a result of the explosion of a giant cracker, he standing about fifteen feet from the cracker. This wound lacerated his right jugular vein, as it was thought by the physician. The wound was dressed aseptically and the vein was tied. There was some little difficulty in tying it. He had put a tin can on top of the cracker and had been hit by it after the explosion.

After we had done up the wound in what we thought was a proper manner, it commenced to bleed again, and we opened it again and tied the vein and as a result there was no more hemorrhage.

I had supplied myself with the tetanus antitoxin and desired to give it. The family physician rather thought we had better not give it. The patient was exsanguinate and weak and we thought we had better defer it and the family too were opposed to its being taken.

On the 5th of July the patient was comparatively comfortable, and on the 6th of July I asked the privilege of going to see the patient. His temperature on that day was 102½. The family physician desired me to give the tetanus antitoxin. I therefore on the 6th day of the month gave him six cubic centimeters of the antitoxin.

On the 7th the temperature was 101, on the 8th, 103, on the 9th, 104, and he complained (I went to see him on that day) of a pain on the side of his head. I recommended to the physician in attendance to give him calomel and rochelle salts, which he did. On the 10th, the temperature went down to 101. On the 8th the temperature was 100½.

Of course I have just taken this from the record as I could get it and have written it down as I found the temperature on each day, although it was taken two or three times during the day, and sometimes it was less than others.

On the 12th the temperature was 101. On the 13th the patient had a chill and the temperature was 105½. I was sent for and asked to bring some antitoxin. By the way, the physician had sent me word that the patient had had a convulsion and that his jaws were set as he expressed it. I went as soon as possible. He had got over the convulsion when I got there. The temperature was 105½. I could not introduce a knifeblade between his teeth. I gave him 25 cubic centimeters of tetanus antitoxin hypodermically.

On the 14th his temperature was 101; on the 15th, 103; on the 16th, 105; on the 17th 105, at 730 p. m.; on the 18th, 102; on the 19th, 101, and it continued to remain at from 101 to 103 until about August 1, when an abscess had formed, which was incised and about two ounces of pus was discharged. The temperature ran down to 100 and after the 4th day of August the temperature was normal, and about the 17th of August the wound was completely healed and the patient discharged by his attending physician.

On the first day of August I was called to see another case of a little boy eight years old. The mother gave me the history in this wise: The boy had been jumping in the hay and she thought he had injured his spine. He may have fallen against something or other and injured himself in that way. This young boy had had a convulsion. I also gleaned from the mother that he had run a little sliver in his heel. I examined the wound and could see nothing of any special account and gave him some of the usual remedies for a man that is spasmodic, but the next day I went to see him again and he had had numerous convulsions. They may have been hysterical in character; at the same time, feeling that the antitoxin had done so well for the other boy, I gave him ten cubic centimeters of the tetanus antitoxin in his leg. I wish to state that this boy had double convergent squint. The head was turned toward the left, and there was a toxic(?) spasm of the whole body; his feet would be right out straight, and that remained right along so. On the 3d day of August I gave him

fifteen cubic centimeters of the tetanus antitoxin and on the 4th day of August I gave him fifteen cubic centimeters, and on the 5th day of August I gave him fifteen more. These convulsions lasted but a comparatively short time. They may have been hysterical in character, and I remarked to the physician with me that probably they might be, and I would also state that this boy lost quite a few worms, too.

By the 12th day of August the convulsions had all passed away (in fact on the 9th day), but on the 12th I was called to see him and I extracted a sliver an inch long from his heel. By the 22d day of the month the patient walked out doors comparatively well.

In conclusion I will say that if the health officers of the State of New York will take for their guide Dr. Daniel Lewis, our State Commissioner of Health, many lives will be spared and the people will rise up and call him blessed.

Dr. Phillips—I simply want to ask Dr. Edwards one or two questions connected with this.

I think that the registrar will find that some time about two years ago there was a case of tetanus reported from our section. I simply want to state the case and then ask the doctor some questions in relation to it. It was a strong, active and vigorous farm girl of twenty-one years of age, who was engaged in taking plants from a hotbed and conveying them to the garden and transplanting them as we call it. In the process of transplanting them she sustained an injury to the hand, some mild laceration of the hand, whether it was a nail or piece of wire or a pin or whatever it was. There was a small laceration of the surface of the hand. She continued her work right along.

It ran along for three days and in the after part of the third day she experienced considerable soreness of the hand. It seemed to be swollen and painful. During the night she had characteristic symptoms of tetanus, or a sort of stretching sensation, and during the afternoon of the next day she had perfect symptoms, and during the afternoon of the next day it seemed to assume a form of drawing to one side. At the close of the fourth day her jaws became set, a perfect lockjaw, and that condition continued. I might say, by the way that a physician was called, a young physician, a bright, active young fellow (I would speak with all deference and respect for the young physician) and he pro-

nounced it a case of hysterics and admistered hypodermic injections of morphine and left the patient.

At the commencement of the 5th day I was called and I found the patient in that condition,—perfect symptoms of an acute disease in every respect—that is acute tetanus in every respect, and it occurred to me that I would use the antitoxin for tetanus. I had it with me and I did use it, twenty-five c. c.; but the patient died about six hours after I saw her.

What I want particularly to know is this: Did that patient contract the germ of tetanus at the time she was engaged in the transplanting of the plants, putting them in the ground, or did she contract that from the earth? In what way did she obtain the germs of tetanus, and if I had been called at the commencement, at the time of the injury, and had used the antitoxin for tetanus at that time, what would probably have been the result?

According to what Dr. Edwards has said, it would be that I would have saved my patient; but there were not symptoms at that time sufficiently severe to guarantee the administration of the antitoxin at that time. These are questions that I would like to have answered.

Dr. Edwards—I will simply answer in this wise: I believe that it would have been proper to use the tetanus antitoxin at that time. I feel that you did not do your duty, that you should have used the antitoxin anyhow.

Dr. Phillips—Remember that I did not see the patient until six hours before she died, and five days after the injury.

Dr. Edwards—I understand. If you had been called you should have used it. I believe that that girl received that germ from the earth, from the fact that I remember something as to the character of a case that occurred down on Long Island or in New Jersey somewhere where the bacillus contracted from the earth produced tetanus and death. I believe it was the right thing to do as I did in all these seven other cases, as I have reported, and I have the authority of Dr. Lewis, which he gave all the health officers (he did me at least) to use this tetanus antitoxin in all cases, which I have done.

I cannot account especially for this fact: This boy became quite emaciated. He was a bright, active, sturdy boy, and he

became quite emaciated, and I felt that he may have had some septic condition, no injury, I mean as the result of the primary wound. I did say to the family at the time that I gave him the twenty-five cubic centimeters, as he complained so much about his head, that he might have a disease of the brain. I felt that he might, from the fact of that dull and sleepy condition, coma.

Dr. Scott—I want to add a report of a case which had an unfavorable termination, occurring last summer. On the 6th or 7th of July a physician in our city was called to see a child where the family had told him that the child was suffering from convulsions. He saw the child and found that there was a slight wound on the finger which had been obtained by the explosion of a firecracker on the 4th of July. The child was in a state of tetanus, and the physician immediately came to my office and applied for some tetanus antitoxin. I gave him all I had, which was thirty cubic centimeters.

This child was three and a half years old. The antitoxin was used but with no results whatever. I telegraphed for more antitoxin to the State laboratory, but within three or four hours afterwards the child was dead, before we got the fifty additional cubic centimeters which was sent for.

The only thing I regret in the case was the fact that the tetanus antitoxin was simply introduced hypodermically. I wish it had been put in the spinal canal. That was my advice. Perhaps the result would not have been any different, but I think that was the method that should have been used in that particular case.

Delegate—A year ago last Fourth of July we had a case reported as tetanus. It was caused by a firecracker burning the child's finger. The first convulsion occurred on the 8th. On the evening of the 8th we trepanned the skull and gave thirty cubic centimeters, with no result whatever. The child died.

Dr. Veeder—I see that Dr. Pease has something to say, and before he starts I would like to ask one question.

We had in Palmyra during the last few months a case of tetanus (neonatorum). I want to ask whether that would do any good to use antitoxin in such a case.

Dr. Pease—To begin with Dr. Edwards' case, it seems to me very doubtful whether the first case at least was a case of

tetanus. I would like to ask the doctor how soon after the injury the patient had those spasms in the jaw?

Dr. Edwards—On the 6th of the month, that was the first day.

Dr. Pease—He was injured on the 4th?

Dr. Edwards—He was injured on the 4th, and on the 6th showed a disposition as to the closing up of the jaw, and I gave him ten cubic centimeters of the tetanus antitoxin.

Dr. Pease—How long did this condition continue?

Dr. Edwards—It lasted comparatively no time,—that day; but on the 13th he had a chill and then I gave him twenty-five cubic centimeters, or one-half of one of the bottles that contained fifty cubic centimeters.

Dr. Pease—Did he have trismus after that?

Dr. Edwards—For about three hours, no longer, but there was a stiffness like of the jaw, but at the same time he could open his mouth.

Dr. Pease—In view of the fact that the injury occurred in the neck, and without any question this case had a septic element from the beginning to the end, and also owing to the fact that the spasms began within forty-eight hours or thereabouts of the injury and continued only a few hours afterwards, and then recurred later, it would lead me to believe that the case was not one of tetanus. I have never known of a case of true tetanus myself and have found none reported in the literature, that did not have spasms, if they lived, for at least ten days to two weeks; so that any case of what we may suppose to be tetanus which does not have the spasms for from ten days to two weeks can be ruled out as a true case of tetanus. I have never heard or read in the literature of a case which was so improved by the administration of antitoxin that the spasms did not continue for that length of time.

Dr. Goler—Tell us the shortest period between the time of the injury and the time of the beginning of the spasms.

Dr. Pease—Rose reports one case in 24 hours. I have examined the clinical history of the case and came to the conclusion that it was not a case of tetanus. The earliest which I would care to credit as true tetanus was at least three days.

You must understand that the tetanus bacillus requires a certain length of time to develop. The conditions of the wound at the time of the injury are not favorable to the growth of this bacillus. Only as the tissues decay and suppurate and form an opportunity for the growth of this bacillus, will the bacillus, even if present, develop. It then requires at least eight to twelve hours for the tetanus bacillus to develop a sufficient quantity of toxin to cause spasms. Then, as I told you last year, the course of the toxin from the site of the injury to the central nervous system where by irritation of the nerve cells it causes the spasms, is along the nerves leading to the central nervous system, and it certainly takes time for the toxin to pass from the initial point of the injury to the central nervous system. This time has been determined and varies with the amount of poison present and the rate at which it is generated. In animals of the size of the human being or larger, it requires anywhere from four to five days as the shortest period of time from the introduction of the poison to the first evidences of the symptoms. Even in the smaller animals like mice and guinea pigs it requires from 24 to 36 hours to pass along the nerves to the central nervous system.

So that we can say that any case exhibiting symptoms of tetanus before the third day after the injury is probably not a case of true tetanus. The maximum length of time in which symptoms will appear is up to three or four weeks.

Now, as to some of the other cases that were reported, I wanted to ask Dr. Phillips one question, and that is, how soon after the injury in his case did the first symptoms become manifest?

Dr. Phillips—About four days, nearly four days.

Dr. Pease—That was the only point I had in mind about your case being a case of tetanus. With that settled, I think I can say very definitely that you undoubtedly were dealing with a case of tetanus.

Dr. Phillips—It was about four days. It was a very marked case of tetanus as far as the symptoms were concerned.

Dr. Pease—Evidently. The cases occurring within four days of the injury are almost certain to be fatal. The cases occurring within the first week are almost certain to be fatal.

A case that does not develop until two weeks after the injury has some hopeful aspects to it, but even there we have some of the severest cases developing after two weeks from the time of the injury. A case developing three weeks after the injury is almost certain to be a chronic or mild case and these stand a fair chance of recovery. In the cases which occur within ten to twelve days after the injury and in which convulsions do not supervene within 24 to 36 hours, there is some hope in the use of antitoxin in large amounts. In the acute cases it is absolutely useless to expect any favorable action from the use of antitoxin. In the chronic cases we may say that some benefit may be derived, but these cases are likely to recover anyway. It is in the class of sub-acute cases, where the poison is present in considerable amounts in the circulation, and only in moderate amounts in the nerves at the time of the first symptoms, that we are able to neutralize the toxin in the circulation and the case is thereby saved from fatal termination. Toxin present in the nerves is impossible for us to neutralize by any methods that I know of. Antitoxin injected subcutaneously or injected into the subdural space is unable to get at the toxin in the nerves and neutralize it. Therefore, if by the time we first administer antitoxin there is a fatal dose of toxin in the nerves, the case is bound to die, notwithstanding anything we can do, unless our present knowledge is at fault.

Dr. Hallenbeck (of Canandaigua)—I would like to illustrate our experience. We find that we have cases occasioned by the use of the corn shredder, particularly where the farmers use a great deal of manure in fertilizing the ground, and we have trouble from that. In Canandaigua last year and the year before we had two cases of tetanus that died, and since then we have adopted a plan by which we have had no trouble since. We had three within the last two months where the hand was badly lacerated, and we injected about 50 cubic centimeters at the time of the injury along the sides of the nerves and into the general system. Of course we have had no tetanus in those cases, and it might not have happened anyway, but I don't know what harm the antitoxin could do at any rate, and if it does any good, we got ahead of the trouble. We have had no reason to regret using

antitoxin before any symptoms present themselves, at the time of the injury.

Dr. Pease—If I may be pardoned for speaking again: The cases spoken of by the doctor are certainly interesting, and present one or two features which are worth while calling your attention to. The first is that he injects it around the nerves. That is a very wise precaution. He uses rather larger amounts than are necessary, but they do no harm and undoubtedly make assurance doubly sure. By injecting antitoxin along the nerve he prevents the end of that torn nerve from absorbing any toxin which may be formed in the next few days at that location. In a small, slight injury it is sufficient to inject antitoxin subcutaneously into any region of the body. The antitoxin distributes itself throughout the circulation and any toxin formed throughout the body will be neutralized by the antitoxin in the blood serum.

However, when you have a large nerve, so injured that its torn ends are exposed, the proximal ends of these nerves are capable of absorbing the toxin immediately after it is generated, and before the serum in the circulation and the antitoxin which it contains has an opportunity to neutralize it. Therefore, in a large injury with torn nerves, it is very wise to introduce the antitoxin directly into the wound and also to take the double precaution of preventing any absorption along the nerves by immunizing the nerves themselves.

Dr. Phillips—At the time I saw the patient in the case I referred to, the first thing I did was to open the injury, the part that was injured. Now, the outside cuticle was thoroughly healed, all closed up and apparently no laceration, but I found on the inside at the least calculation one half ounce of pus. That is very essential in the case.

Dr. Symonds—I wanted to ask a question or two and report a case. One of the questions is: If the tetanus germ is taken into the alimentary canal, does it ever produce tetanus? And what about the use of gelatin?

A friend of mine, a physician, lost his wife from tetanus, from using injections of gelatin for hemorrhage. I have to report a case of tetanus in a grown woman who injured her forefinger one Fourth of July with a toy pistol. Some four or five days

afterward she was taken with the initial symptoms of tetanus. I injected all the antitoxic serum that I had and borrowed all I could get from my neighbors in an adjoining town, but she died in a few days. I will say for the antitoxic serum that it stopped or controlled the convulsions in the case, but it had a fatal ending.

Dr. Hallenbeck—I would like to say in regard to that case of mine: I am not certain as to the date; but I don't think there is any question about that case being tetanus. It was not later than the eighth, and somewhere between the sixth and the eighth day that this child developed convulsions.

Dr. Pease—If I may be pardoned for speaking a third time. I think it is due the Department that I state that we are prepared to let health officers have as much tetanus antitoxin as they desire to carry in stock, so that they will be prepared to treat injuries as they arise and cases as they also arise. All that is necessary is to make the required application and requisition, and I hope that when the antitoxin is used either for the purpose of immunizing, which of course we strongly recommend in all cases of injury where there is the slightest possibility of tetanus developing, or in cases where the antitoxin is actually used in the disease itself, that the health officers will make reports of these cases, so that at the end of the year we can summarize the results that we have obtained and be able to report at meetings like this the success we have had.

I may say that I have never heard as yet of any case where antitoxin was used for immunizing purposes where tetanus followed. There have been two cases reported in the literature. One was a case similar to the case spoken of where the hands were torn and large injuries were inflicted, and the toxin was absorbed even after the subcutaneous injection of an immunizing dose along the nerve, which had been torn through; but the symptoms of tetanus in that case only existed in the part that was supplied by the nerve which became infected.

In the other case the antitoxin injected as an immunizing dose was too small and the person had a mild attack of tetanus afterward.

A Delegate—What size doses do you recommend?

Dr. Pease—Ten cubic centimeters of the tetanus antitoxin serum is sufficient for the immunizing dose in most cases, but where there is a severe injury, and it is known that tetanus is likely to follow the injury, one or more doses of this size are to be recommended,—I should use two or three doses of the antitoxin in the cases that you speak of. It does no harm.

Dr. Hallenbeck—Would you ever use more than ten cubic centimeters in the child?

Dr. Pease—Ordinarily I think that the age element in the use of diphtheria and tetanus antitoxins is of very slight importance. The age does not determine the question of the virulence of the germ or the amount of the toxin produced except in a very slight degree, and I would treat a case of diphtheria in an adult and in a child with exactly the same dose. That dosage would be variable, according to the severity of the disease, irrespective of the age.

Dr. Johnson—If nothing more is to be said on this question, we will pass on to "Eight Years' Experience With Formaldehyde Disinfection."

A Delegate—I would like to ask Dr. Pease if there would be anything that the physicians could do if they had a case of tetanus, with samples of the blood?

Dr. Pease—I think not. The amount of tetanus toxin in the blood is very slight and hard to determine, and the report on the clinical aspects of the case gives us ample opportunity to make a thoroughly good and correct diagnosis.

EIGHT YEARS' EXPERIENCE WITH FORMALDEHYDE DISINFECTION.

By Dr. WALLACE CLARK, OF UTICA.

To submit a paper on formaldehyde to such a body of men as this,—men who are entirely familiar with it,—appears to me to be an imposition. But in older countries a royal invitation is always a command, and as our sanitary king has invited this paper, I have been obliged to accede.

I do not propose to give you any academic dissertation upon formaldehyde, nor enter into its chemistry,—matters which have been thoroughly threshed over by able men and which are now

familiar to all health officers. These notes are simply the result of my own personal experience in the use of formaldehyde for city disinfection.

In the fall of 1896 I made a number of very crude experiments with formaldehyde as a disinfectant, and the results satisfied me that it was of great value. In my own city previous to this time sulphur alone was used for disinfecting and fumigating houses. In January, 1897, there was completed an up-to-date compressed steam disinfecting vacuum plant. This was heralded as the Ultima Thule of disinfection. It was first used, following a case of diphtheria, in my own practice. Two inspectors, accompanied by a team and sacks, visited the house and removed all the contents of the one room, including carpets, hangings, bed clothing, body clothing, boots, shoes and hats, in these sacks. On the way to the plant three children mounted the sleigh and rode on the sacks. After several hours the contents of the sacks were returned purified,—yes, purified and changed. All the clothing was shrunk, the leather and kid gloves very much wilted,— a pair of No. 10 brogans would squeeze the foot of a child. In fact, all but the cotton goods were practically useless or discolored. These goods were returned to the house and disinfection was deemed complete. There was no further disinfection of the rest of the house, and these disinfected goods were simply returned to resume their former relationship with the contents that had not been removed; in fact, within a few hours these disinfected goods had become reinfected from their former associates.

The cost of this so-called disinfection of a room was: Labor, $2; team, $1.50; rent of disinfecting plant and use of steam, $4; in all, $7.50.

Three months after this incident I was appointed health officer of the city and immediately visited Boston and New York city to learn their methods.

In Boston I learned that they had purchased a Trillat's Autoclave, which Dr. Durgan showed me, stating they had not used it, that they were still using sulphur, but he intended to test its merits.

In New York city I found that reliance was placed on steam disinfection and sulphur, and on inquiry about formaldehyde,

learned that they were making some experiments at the laboratory. The publication of the results of these experiments later was very gratifying reading to me. However, on my return to Utica I felt that I would make no mistake in displacing sulphur by formaldehyde.

The steam disinfecting plant was closed and from April, 1897, formaldehyde alone has been used for disinfecting houses in which existed contagious diseases.

METHODS.

The formaldehyde used is a commercial solution said to contain 40 per cent. of gas. I have found this percentage of gas to vary greatly, from 25 per cent. up to 37.5 per cent.; the latter is an American-made solution which costs 10½ cents per pound. The 25 per cent. solution was imported, and that which had stood for over nine months in our cellars and in all probability had lost a fair percentage of its gas, became milky and opalescent. This has taught me that in making contracts for the purchase of formaldehyde in carboy lots, care should be taken that only a three months' supply be purchased at one time.

The amount used has averaged from eight to ten ounces per thousand cubic feet of space.

The instrument first used was a patented Trillat's Autoclave, the heat for regenerating the gas being produced from wood alcohol and was a somewhat troublesome and expensive method. Later, I made several tin lined copper boilers heated by Primus lamps burning kerosene oil. Such a machine can easily be made for $6 or $7 apiece.

Another method used, and chiefly for disinfecting kitchens after the rest of the house had been disinfected, is the open hot method, by merely boiling on the kitchen stove the requisite quantity of solution in an open vessel.

The third method, or spray method, and one I think limited in its use to the city of Utica, in houses heated by hot air furnaces, is as follows: The formaldehyde solution in a large rubber douche bag is suspended from the ceiling; the tubing terminates in a broad end piece, perforated by 20 or 25 needle holes. A hot firepot is necessary, against which, through the water back door these fine jets play upon the outside of the firepot; im-

mediate volatilization occurs, the gas and steam being carried in the regular draft of the furnace through the registers into every room in the house. By this method very large quantities of gas can be regenerated in the shortest possible time and the consequent percentage of gas in the rooms is very much greater than under any other method, as there is less time for unavoidable leakage. Ten pounds of fluid can be evaporated in four minutes by using this end piece with 3½ feet gravity pull.

The usual precaution of making the house as airtight as possible having been taken, the family are removed to the kitchen, wearing only what clothing is necessary for their comfort. All other clothing is left in the main part of the house to be disinfected with the house. The house having been loaded with the gas either by means of the machine or through the furnace, it remains closed for eight hours. The windows and doors are then opened and the house ventilated by perflation. Then the family in the kitchen each receives a disinfecting bath, usually in the shape of a sponge bath. This disinfectant is either one to 2,000 corrosive sublimate or a one per cent. formalin solution. As soon as bathed, the bather passes into the front part of the house and dons clothing that has been disinfected with the house. The last bather places in a vessel upon the stove a sufficiency of formaldehyde solution and passes into the front part of the house, closing the kitchen door. The solution on the stove now disinfects the kitchen during the night and all wearing apparel that the family had been wearing. When these details are carried out I am satisfied no part of the house escapes thorough disinfection.

As our public library and schools are all heated by the hot-air furnace method, the disinfecting of them by the douche or spray is a very easy matter.

CRITICISMS.

Is it dangerous? All formaldehyde solutions contain a certain amount of wood alcohol. If this can be ignited it is certainly dangerous. This can occur with machine disinfection. The stopcock may be left closed by carelessness or mistake and, of course, and explosion may occur. A twist or compressure of the rubber tube may occur in some way and this latter accident from external

pressure upon the tube on one occasion came near burning up a large clothing manufactory in the city. This is the only danger from the machine.

The danger to the machine arises from the disinfectors turning off the fire and promptly shutting the stopcock, and of course as soon as the steam and air in the boiler condenses, producing a vacuum, the boiler will collapse from outside air pressure. The remedy for this is to have no stopcocks on the machine.

The open pot method and the spray method are entirely devoid of danger.

The second criticism is insufficient penetrability. Without exception I find that sanitarians agree that as a superficial disinfectant formaldehyde has no peer, but some doubt has been thrown upon its penetrability. Dozens of bacteriologists have written of their experiments in which the pathogenic bacteria has been enclosed in sealed envelopes, wrapped in numerous folds of cotton or blankets, imbedded in the center of mattresses, secreted in the linings and pockets of clothes and after the usual exposure to formaldehyde gas, as in ordinary room disinfection, no growth could be obtained.

I have raised the end of undisturbed carpets three days after the ordinary disinfection of a room and stinging eyes and sneezing have demonstrated that the carpet has been thoroughly penetrated. Shake up any mattress a couple of days after ordinary disinfection and you will find strong evidence of penetration.

Finally, the pathogenic bacterium does not wrap itself up in sealed envelopes and bury itself in numerous folds of blankets to escape from the public disinfector; he simply lies where he falls and cannot escape the regular house disinfection.

In this connection a fair proof of its penetrability will be shown by the nonrecurrence of the disease after disinfection.

There have been about 3,000 fumigations in the city of Utica by formaldehyde during the last seven or eight years. The disease scarlet fever has recurred in only two cases. In each case the well child had been promptly removed from the house to return after the recovery of the sick one and disinfection of the house. At the proper time both of these children came down and it was only a fair inference that the disease had been contracted in their homes after their return. On investigation I

found in one house the mother had not disinfected her hair and the returned child slept with her that night; also that the sick child had a couple of guinea pigs as pets, and kept them in her sick room, these guinea pigs receiving no disinfecting bath. The recurrence of the disease in this case came either through the mother or the guinea pigs.

In case two, although the house proper had been perfectly disinfected, the parents had neglected to disinfect the kitchen at night and take their disinfecting bath.

SMALLPOX DISINFECTION.

In the early part of 1900 a case of imported smallpox was discovered in an Italian tenement where 30 tenants were. It was promptly removed to the hospital, the inmates vaccinated and the house disinfected and quarantined. At the end of 16 days the house was released from quarantine. Not an article of bedding or clothing had been destroyed and no other case developed from that house.

During the same week two other imported cases were discovered, the same treatment followed and no new cases developed, although no quarantine was maintained.

In 1902, 18 cases of smallpox developed in Utica. Ten of these were cared for in their homes and eight in the hospital. In the homes the same treatment as before mentioned was followed,—no clothing was destroyed, the house thrown open after disinfection,—and no new cases appeared.

In the hospital, after the dismissal of the last patient in April, 1903, all the clothing, bedding, utensils of every kind were packed in packing cases, after disinfection; nothing was destroyed. Since that time plumbers, carpenters and scrubwomen have been in the place.

Four months ago, during the repair of the contagious hospital, the smallpox hospital was opened for scarlet fever, in all about 20 cases have been inmates. The bedding, clothing, etc., which had been used the year before for smallpox came into service and no case of the former disease has developed.

After these examples I would simply ask, does formaldehyde disinfect and has it sufficient penetration?

In passing I would allude to disinfection by solid formaldehyde. The solid formaldehyde is in all likelihood a polymerd of formaldehyde. In one form on the market the solid is heated in the dry state, by a cone of ignited carbon superimposed; in this no moisture is produced in the air.

The other is to add the solid formaldehyde to a certain quantity of water and then proceed in the open pot method; but with these forms I have had very little experience and they are much more expensive. The direct generation of formaldehyde gas from wood alcohol by different lamps, is as yet to me an "unknown country."

In the new library at Utica, opened on the 12th day of this month, there has been set aside a room for disinfecting books. This room I should judge contains about 720 cubic feet; it is almost airtight. In one corner is a heated exit flue protected by a valve; at the other end of the room, similarly protected, is the opening of a flue which brings air from out of doors; here the open pot method is used,—a small gas stove fed from the gas pipe, with stopcock outside the room.

The books are carried in on trucks with slatted shelves, back of binding up and loosely packed. The gas stove is lighted, on it is placed an iron pot, deep enough to prevent the fluid from boiling over, and in this pot ten ounces of formalin are placed. In ten minutes this solution is entirely evaporated and the gas is turned off from outside, and after several hours exposure the inlet and outlet valves are opened. In 20 minutes the librarian can remove the trucks without discomfort.

The same method is being used to disinfect the surgery in one of our hospitals.

This method requires no skilled labor or apparatus and eliminates all danger.

Among other uses for formaldehyde I have found that a few pounds diluted with as much water will remove the vilest odors from outside closets and hold them so for several days; but this would prove an expensive treatment, much more so than the lime method.

The disinfection of the excretions from the sick room is most thoroughly and rapidly done. In incontinence of urine in bed-

ridden paralytics, a small quantity of absorbent cotton will keep the atmosphere pure.

In all this extensive use of formaldehyde during these years I have found it to injure but one thing, and that was living plants; these should be removed from the rooms before the gas is introduced.

This property of formaldehdye has been made useful in preventing the growth of grass on undesirable places.

To sum up, I can do no better now, seven years later, than to give the deductions from the report to our local board of health in 1897. Speaking of sulphurous acid as a disinfectant, it requires that the air of the room should be well loaded with watery vapor,—a condition that does not exist in our heated houses; and lastly, it readily takes from the air another atom of oxygen, converting it into the corrosive and destructive sulphuric acid. The condition of the wall paper, gilt pictures, silverware and most apparel, together with the persistence of the irritating and obnoxious odors in the room for several days, justify the resistance offered by the householders to the visit of the disinfectors.

Method 2. Live steam under pressure.—An apparatus for the application of this method was installed in this city last year, and is, without question, a thoroughly reliable one. That it completely accomplishes the purpose, where it is available, can not be gainsaid. But it, too, has its disadvantages.

Firstly. It can only be used to disinfect material that is carried to it, and this material is only cheaper and commoner goods. Leather goods, feathers, apparel made of finer wool, and colored hats, fans, etc., are ruined by the process.

Secondly. It is expensive, for it requires a team to transfer the goods and occupies the time of two men at least half a day.

Thirdly. The room, with its ceiling, wall and floor dust, the furniture with its cracks and crannies to shelter contagion, the most delicate wearing apparel, etc., are left behind. They can not be put through the disinfector. Will we return the purified goods from the disinfecting station to resume their relations with their unpurified neighbors in the room? No. Then another disinfection must be made. How will this be done, with sulphur? No. For lack of confidence in sulphur disinfection could be

the only reason for installing this expensive plant. For if sulphur were effective, the disinfecting would have been continued on the premises. This now brings us to

Method 3. The use of formaldehyde for disinfection is comparatively recent. Favorably impressed by its use in a small way and convinced by the report that reached me when I received the appointment of health officer of Utica, I immediately went to Boston and New York to investigate the subject of disinfection by this gas. I returned feeling that I would make no mistake in displacing sulphur by formaldehyde. By your favor a small generator was obtained and has been in steady use since. As to its advantages:

First. It is a most potent disinfectant, and being of the same specific gravity as air, will penetrate wherever air will, disinfecting at all levels of the room.

Secondly. It will injure nothing in the apartment but the microbes. While a most potent germicide, it is nonpoisonous to higher life, rats and cats having been submitted to the fumes with but little discomfort; and on several occasions I have placed a patient in an atmosphere fairly charged with this gas for an hour or two, some slight irritation of the mucous membrane of the eyes and nose alone ensuing.

Thirdly. It is inexpensive, and by long odds the least expensive when we take into account the destruction and loss following the use of sulphurous acid. Again, the disinfection of an ordinary residence costs less than half of the mere transportation of the goods to the steam disinfecting plant.

Fourthly. With the new apparatus the work is very simple and convenient; there is much less waste of time and labor, requiring but one man to do it; the fear of fire, as in sulphur, is avoided; the odors are quickly removed by opening the windows, and instead of arousing opposition it is welcomed by the householder, as nothing in the house is disturbed.

Fifthly. It is to me the most practical method of disinfecting large buildings, such as churches, theatres, public libraries and schoolhouses. With the greatest ease can cars be cared for, and for this purpose it was largely used last autumn in the yellow fever stricken region. Its powerful penetrating power was also used in disinfecting the mails.

For these reasons, I recommended that the great expense of maintaining the steam disinfecting plant on Rome street should be saved to the taxpayers, and this has met with approval.

These conclusions should not be considered as any criticism upon former members, for they installed the most perfect plant for the disinfection of movable goods; a plant that at seaports surpasses, perhaps, any for the disinfection of clothes of immigrants from suspicious localities, before they are permitted to come into the country.

But for our purposes, I feel that we have in formaldehyde an equally potent disinfectant, one more available, more convenient, more practical, less limited in its application, and less expensive.

Dr. Johnson—Gentlemen of the convention: This paper is now open for discussion. Do any physicians desire to say anything upon this subject? I believe a year or two ago Dr. Pease discussed it very thoroughly. He might have something to say that might be instructive.

Dr. Pease—I should prefer to hear from the members of the conference before making any remarks. I have one or two points to talk of at that time.

Dr. Scott—I want to say that my experience with formaldehyde extends about the same length of time as that of the writer of the paper. I began in 1896 or 1897. My first experience was with smallpox. Previous to that time we used sulphur disinfection, and it was the first smallpox we had had for twenty years, and it did not seem to me that the sulphur afforded the same measure of disinfection. I made arrangements to have the house disinfected with formaldehyde gas, and during that time and since that time there have been initial cases of smallpox at four different times in our city, and at no time has there been a recurrence of the disease after the original cases were stamped out.

Now, in regard to the method, I didn't hear anything said about candles. The other method is all right and I haven't a word against it, but we have been using the candles. It was definitely determined by the bacteriologist who works in connection with our board that one of the candles made by Johnson & Johnson was capable of disinfecting 300 cubic feet of air

safely, and one of the larger candles 500 feet. The method we use is, we go into every room and measure up or estimate, usually measure if there is any question about it), and we are sure to put enough candles in the room so that the number of cubic feet will correspond with the size of the candles. These are burned in every room in the house.

It seems to me that the advantage of the candle method is that you can distribute the candles here and there around the room and thus distribute it throughout the whole house, rather than confining it to one or two places in the house.

We are unfortunate in our city in the fact that we have no contagious hospital other than the quarantine hospital for the care of smallpox. It occasionally happens that we have to send a case,—for instance, at the present time we have two cases of diphtheria quarantined at the quarantine hospital. Perhaps now I am very particular from the fact that whenever we have smallpox no mattress or anything of that kind is left in the hospital. I disinfect those by fire; I don't even trust formaldehyde.

I might say from the fact that we have frequently cases other than smallpox quarantined at our hospital, that we never have had any trouble whatever from this cause, and never had any recurrence of smallpox there. Last summer we had a most malignant case of smallpox die at the institution, and as I say, through the method of disinfection that I have outlined with the candles, there has been no further trouble.

So that we feel after an experience of seven or eight years in the use of formaldehyde that it is a perfectly safe disinfectant, and I think it is a boon to sanitarians that we have such a gas to take the place of the unsatisfactory methods by the use of sulphur.

Dr. Clarke (of Glens Falls)—I would like to criticise that method spoken of as the open pot method. I have always understood and I think experiments have proven that in order to get the greatest germicidal action from formaldehyde, you have to have a dry gas. In order to get that open pot method, the last person out of the kitchen puts the pot over the fire. You can not seal the room and there is a draught up the chimney, and I think it would be practically worthless.

Dr. Scott—I might add that in cases of scarlet fever and smallpox and other contagious diseases, not to my knowledge have we had a single recurrence in a house that has been disinfected with formaldehyde.

Dr. Johnson—By the use of the candle?

Dr. Scott—Yes, sir.

Dr. Greene—Mr. Chairman, the manner of disinfection is one that is to be looked at from a pecuniary point of view in large communities. Most cities now, I think, disinfect after all cases of scarlet fever, diphtheria, tuberculosis and smallpox,—at least the city of Buffalo does, and we used the candles and we found that the candles were very expensive as compared with the 40 per cent. formaldehyde solution.

It is not necessary to go into detail, but I wish to say that a proper disinfection can be done for about ten or twelve cents per thousand cubic feet. That is the entire cost for the formaldehyde, and the alcohol necessary to disinfect a thousand cubic feet will cost four or five cents, and the apparatus for doing it will cost seven or eight cents, and the apparatus can be used over and over again.

Dr. Edwards—In the city where I come from we have had during the month of October sixteen cases of scarlet fever, and my mode of procedure is to fumigate all houses with the formaldehyde, with the open pot method. We use a gas stove or gasoline stove. I fumigated our school buildings, in one of which there were eleven cases of scarlet fever and during the month of November there were but three cases of scarlet fever, and also in the month of December so far reported.

Last winter we had one case of variola, and I fumigated that house with the open pot method and used no other. I think it is the only way. Candles are of no account.

Dr. McClellan—Mr. Chairman, I too, have had some little experience in the use of formaldehyde. We have used it in the village of Saranac Lake for the last eight years, and I can not tell you how many disinfections we have had, but anywhere from 500 to 1,000 each year. We have not had a single infection after any infectious disease where disinfection with formaldehyde was had. Of course a great many of these cases are cases where the rooms have been vacated by consumptives, and it is pretty hard

to tell whether it was possible to have disinfection in those cases because the recurrence would be so remote that they could not be traced to the rooms; but I speak now of the acute diseases, scarlet fever and diphtheria particularly.

We have had in eight years about 25 cases of diphtheria diagnosed bacteriologically and there has been but one death in that time, and that was a case brought from Newark, which was in a moribund condition when it arrived in Saranac Lake. That child died. We have not had a single case of reinfection from diphtheria from any antecedent case except one. That was a case that occurred about a year ago, where the mother nursed a child; the child was very sick but made a good recovery. The physician in attendance was requested by me to come to my office and get a sufficient amount of antitoxin and a syringe and disinfect the mother and any other person that might be exposed. He neglected to do so, and the mother came down with diphtheria just seven days afterwards, but one or two maximum doses settled the matter with her and she recovered.

Now, as to the means of developing the gas. It is a matter evidently of no consequence how it is done, provided you do it, and do it quickly and have the rooms sufficiently well sealed and warm enough. The temperature should not be below 65° and 70°, or 75° would be better. I have used the various machines for developing the gas, and of course I have had no difficulty in getting along with them, but it has always been a source of inconvenience; it was difficult to make the average person that might be employed to do the work understand it or to rely upon them.

I have recently adopted a somewhat different plan. I have discarded all means of heat whatever and I develop the gas now chemically from the solution; and all the apparatus that is necessary is a flat pan like a milk pan. For instance, if I want to disinfect a room say of 1,200 or 1,300 cubic feet, I take a pint of formaldehyde solution, of as near to 40 per cent. solution as we can get, and as Dr. Clarke has told us, it is true that we get it up to 40 per cent. very seldom; but a pint of a fairly good solution is equal to about eighteen ounces. It is a little heavier than water. I take three pounds of lime, unslaked lime, and break it up into small particles about as large as a pea and put

them in and level them off so that it presents an even surface over the pan, take the pint of formaldehyde solution and that must be taken out and poured into a pitcher. To that I add about two ounces to three or four ounces of commercial sulphuric acid, and quickly pour it in, and get out of the room as quickly as possible and seal it up. The formaldehyde will be set free inside of ten minutes.

That is about the simplest and cheapest way that I have yet been able to get at the result. I am testing it bacteriologically. It is our policy to do this with such frequency as to be sure, and to be able to prove the fact that the disinfection has been sufficient to destroy the organisms that might exist, and of this we propose keeping a correct record in the office, so that persons can be thoroughly satisfied, if they choose to come there, as to the reliability of the disinfection had.

I will say also that in regard to the question as to the dry or a moist gas, some two years ago Dr. Hill, the bacteriologist of the Boston board of health, made quite an extended series of investigations upon that very point. The result of his investigations showed that if the atmosphere, not the gas, but the atmosphere in the room, was brought up to a high degree of humidity, the minimum amount of formaldehyde would produce the maximum result. That is to say, you could get complete disinfection with a smaller amount of formaldehyde and in a shorter time than any other way.

I don't think it is desirable to have the gas mixed with steam, because that will tend to prevent penetration, and if the atmosphere in the room and the surrounding objects are in a humid atmosphere the disinfection will be very effective.

I repeated those experiments in my own office, to a considerable extent, and my experiments gave me about the same results that Dr. Hill announced. Of course in this method that I have just described there is no moisture added, but we get the result anyway, and it seems to me that it is about the simplest and most economical way to get at it.

The plan that Dr. Clarke suggests, which he has been using, is certainly admirable where people have hot air furnaces, but in our village we don't have them; therefore his method would not apply to Saranac Lake.

I think it is a mistake, however, to trust to the average layman, who is not familiar with the matter, to do disinfecting. I think it should be done by or under the immediate direction of some one who is thoroughly competent to know that every step is properly taken. It is certainly a matter of the utmost importance that the work should be thoroughly done, if there is any pretense of doing it. That is about the result of what little experience I have had in the matter.

Dr. Goler—In two or three minutes I want to, as clearly and concisely as I can, emphatically disagree, unqualifiedly disagree with everything that has been said this afternoon on the subject of formaldehyde.

In the discussion on the disinfectant it always seems curious to me that nothing is said whatever on the question of cleanliness. What do you do to reduce the infections which you try to disinfect? It seems to me very strange that that is left almost entirely out of the question. You say that you disinfect your premises, you disinfect the outside of your patient, but what do you do with the inside of your patient? What do you do with the tonsils that are loaded full many times with organisms, both diphtheria and other organisms? What do you do with the hollow teeth, with holes in them that are sufficiently large to carry a wad of chewing gum in? You don't do anything with those people, and it seems to me that when we talk of disinfecting, the thing we ought to do is to pay more attention to cleanliness and less attention to disinfecting. I think it would be a very excellent thing if disinfection were wiped off the face of the earth and we substituted the scrubbing brush and soap and hot water in the hands of an intelligent layman with brains in the front part of her head.

Now, in Rochester we seldom speak of disinfection alone,—always of cleaning and disinfecting; and we have a man and woman whose duty it is to clean and disinfect, and we believe that disinfection is in response to a very old theological and superstitious kind of notion that has been handed down from the time when a man went around disinfecting letters by holding them in tongs over some vinegar and birch bark.

Now, in reference to the question of formaldehyde: Some seven years ago we endeavored to investigate the question of

formaldehyde. We didn't endeavor to investigate it in the light of the man who said, "I am easy to convince, but I would like to see the man who can convince me!"

We wanted to use formaldehyde because we thought it was a cheap and at the same time easy method to carry out. We accordingly made some experiments in our own laboratory that were supervised by our chemists, first determining the question of the strength of the formaldehyde used, and again by our bacteriologist who undertook to investigate the cultures that were spread in the laboratory at the time the investigation was made. These cultures were not placed under seventeen thicknesses of blankets or buried under mattresses, but they were simply placed on tables about the room. And we invited one formaldehyde manufacturer to send his own man there, and the only thing we wanted to do was to standardize the formaldehyde which he used and at the same time have him conduct experiments along the lines of our first experiments. One manufacturer after another came and every one of those men failed signally to make any impression upon the culture organism exposed upon ordinary culture media, in this room having 2,000 cubic feet space, within the lines laid down in his printed matter. They did that and we supervised it and in every case they failed. Four of them tried it and a fifth man came along a year or two ago and wanted to carry out some experiments. You don't suppose that we are going to use formaldehyde for disinfection after those experiments. Those are the reasons why I object to formaldehyde as a disinfectant; and I may say, as I said before, that I would be very glad if disinfection were simply wiped out, because I look upon it as only supplemental. It must come into actual contact with everything that is to be disinfected, else it is not efficient, and it should be observed as a supplemental measure.

I say that by disinfection, we are simply doing as the ostrich does,—when it can't get away from its enemy, it sticks its head out of sight, and imagines it cannot be seen. We are teaching the people to rely upon some gas like the fumes of something or other that was used to start up some of the old Druid rites.

If we preach more cleanliness and less disinfection, we shall be a great deal better of. We use sulphur. We don't destroy any goods, and we don't use sulphur perhaps long enough. We

clean the floors and everything and then use our sulphur disinfectant, and we find it entirely satisfactory.

Dr. Nichols (of Troy)—I wish to unqualifiedly indorse everything that Dr. Clark has said. My experience corresponds almost identically with his. For the past five years we have used large quantities of formaldehyde gas in the city of Troy, as we usually have more or less infectious diseases, and we have used that with all the ordinary diseases, including tuberculosis; and in our city hospital I wish to say that during this period we have had at least on six occasions cases of smallpox to care for.

After we have got rid of our last case, we have had the floors and woodwork washed with a solution of bichloride. We have packed up our mattresses and chairs and everything, towels, clothing, sheeting, feather pillows, into little rooms that we have arranged for disinfecting our material. We have poured the gas into these rooms,—they are practically air-tight,—and they have remained closed until we have reopened the building.

Almost invariably we have found a strong odor of gas when we have reopened the room a few months later. During the interval we have had plumbers and carpenters doing the work that was necessary to be done, and we have had no trouble whatever.

The last case we had (as an illustration of my confidence in the use of formaldehyde gas) was this:

I had three Sioux Indians who came to the town with a show, and they developed smallpox. They were placed in the hospital, and as their clothing was of a different character than we ordinarily use, and they had some valuable blankets, etc., I concluded we could save their blankets and send them on to the organization with which they were traveling. I took their clothing and blankets and after giving them a bath, followed with a rinsing of bichloride, for several consecutive days, their clothing was put into a room filled with formaldehyde gas and left twenty-four hours, and they were allowed to put on that clothing and go on to Boston and meet their troupe.

I cannot recall a single instance of fumigation in the city where we have had a recurrence of the disease.

Dr. McClellan—I would like to make one remark in reply to Dr. Goler.

Dr. Lewis—Just one minute.

Dr. McClellan—One minute's time. I only have to say that we are entirely satisfied with the results we have obtained, and I did not suppose it was necessary in this enlightened age to tell people that it was necessary to be clean.

Dr. Lewis—Dr. Clark, would you like to say anything in closing the discussion?

Dr. Clark—No, I have nothing further to say than what I have said. I have given my experience and I find it confirmed by a great many other men.

There is one thing which I did not speak about, and that is (I first heard of it in Chicago) in which they take sheets and spread them, taking six or eight ounces for every 1,000 cubic feet, in sheets hanging in a room and making cultures to discover if there is still life. Any one of you may go home and do that same thing. If you will take six or eight ounces of formaldehyde and sprinkle it upon a hanging sheet and go back when it is perfectly dry, you will think someone has starched it, in other words, two-thirds of the formaldehyde has remained in the sheet; and all the Chicago people have done is to dissipate 33 per cent. of a 33 per cent. solution of formaldehyde in the room. There is where failures will come.

As to the question of sulphur, I have never used it since I became health officer.

As to the cleaning of the rooms, I will defy any man, with a solution of corrosive sublimate or anything liquid, to clean a room in a sanitary sense. You have got your cracks and crannies and upholstered furniture, and there is nothing but a gas that will reach them. The experience that Rochester had last year with smallpox was terrible,—whether its spread was due to that form of disinfection I am not going to say, but I don't think any city in the State of New York nor in the country has had any such a smallpox history as the city of Rochester had last year.

Dr. Lewis—Professor Landreth has an announcement to make, and then there are two or three questions to answer, and we will adjourn for the evening session.

Prof. Landreth—Gentlemen, I want to say a word or two in the matter of the library of sanitation. It is unnecessary to state to

health officers that sanitation is a modern science or aggregation of sciences, in which rapid improvement is being made and constant additions to the knowledge we have are being developed, and that is especially true in the line of bacteriological relations, as they affect the subject of water supply, sewerage, sewage disposal and the like; and it is supposed that every expert professional man, whether physician, engineer or sanitary officer will, of course, have his library complete in the modern works on these topics. The physician and the engineer are officers of permanent standing. so to speak. Unfortunately that is not always the case with sanitary officers,—their tenure of office is sometimes limited; they are changed. They are called into their offices from outside practice suddenly. It is not always the case that sanitary officers find their libraries at the time of their going into duty well stocked with the best literature of the times.

In accordance with the demand or sentiment for the need of something of the kind, the Department has been considering for the last year or so the question of helping in a little way toward meeting the shortcomings in that direction by instituting, in a tentative manner at least, a system of traveling books, by which health officers who may not happen to have the most recent literature on any of the various branches of sanitation, may apply to the Department for a temporary loan of works of this kind, and if it should be found within the appropriation capacity of the Department, to supply these books, they will be loaned the officers for use, and for return.

The details of this plan have not yet been fully elaborated, so that all I wish to say today is to announce the subject in general, and to say that it is the expectation of the head of the Department to have ready at a very early date a circular of information, probably also accompanied by a little catalogue of books, etc., and as a tentative measure we hope this will get into operation very soon. Naturally it would be a matter of gradual development, if it should turn out that there was a demand for it, because books come slowly; but if it is developed that a sufficient need and demand exists for the elaboration of this, we hope that the matter will be capable of future extension at a rapid rate.

Dr. Peck—I hope you will not adjourn at this moment, as many of us want to hear from Dr. Pease.

Dr. Lewis—Dr. Pease belongs to the Department, and we can put him off until evening, if necessary. We will get through with our matters and then let Dr. Pease say what he has to say,—we have no objection to his saying it.

That announcement of Prof. Landreth's will answer one question that has been passed up here, and I wish to state also in that connection that we have been in the habit of making announcements to health officers through the Bulletin, but gradually the knowledge has dawned upon us that a great many of you don't see the Bulletin. It must be so or you would not come down here and ask questions that have been fully answered in the Bulletin from month to month.

Then we learn that in many instances the Bulletin was delivered to the Board of Health and the health officer never sees it at all. We propose now to mail the Bulletin direct to the health officer, with the hope that, when we make a communication to you through the Bulletin, it will reach the proper source.

One question here I can answer myself; the others some of you can answer.

There is a question here that reads as follows: "Can the health officer ask the board of education to compensate him for fumigating school buildings, when there are a number of cases of scarlet fever in the school, when the said health officer fumigates all houses without compensation; or can he ask the board of health to compensate him for fumigating school buildings?"

The obvious answer to that question is that any work which the health officer does in a school building is done for the benefit of the people under his jurisdiction and there is no reason that I can see why the school board should compensate him for doing it, any more than the health board; and the question as to which board shall compensate, or whether he shall be compensated or not, depends upon the custom prevailing in his town, by his town board. I know of no other answer that can be made to that question.

Now, two questions covering exactly the same ground: "What is the duty of a health officer in a case where one or both parents of a child is known to have syphilis, with mucous patches in the mouth?"

The other question reads: "Where there is a family of children affected with secondary syphilis, is it justifiable to keep those children out of the public schools?"

I would like to have some one present answer those questions. I don't know whether the health officer of Buffalo has any experience in that class of cases. What would you do with them, if brought to your attention? (Repeats second question.)

Dr. Greene—We don't do it, no sir; we send them to school. I don't think that would be justifiable, legally or morally,—to keep them out of school.

Dr. Lewis—What does Rochester have to say to that?

Dr. Goler—I don't know,—we would not disinfect them with formaldehyde.

(A voice)—Soap and scrubbing brush.

Dr. Goler—Yes, I think we have recently excluded a child from school by reason of a patch on the tongue. It seems to me it is a desirable thing to keep them from going to school. I certainly should do it.

Dr. Clark—Do you mean hereditary syphilis?

Dr. Lewis—No,—acquired. The question reads "secondary."

Dr. Phillips—You could not exclude them.

Dr. Clark—I would keep them out.

Dr. Curtis—I would say that Dr. Goler is perfectly right in the case of mucuous patches on the mouth; for surely if there was a common drinking vessel that would communicate the disease, and so with any other moist surface lesion; but if the child only has dry, nondischarging sores upon it, of any sort whatever, they are not communicable.

Dr. Greene—I don't mean to be understood to say that if a child has mucous patches on its mouth, it should be allowed to come to school. I answered in regard to the case Dr. Curtis just defined.

Dr. Lewis—Is it a substantial agreement, then, that if it comes to the notice of a health officer that such a child is attending school, it would be good sanitary practice to exclude it until it is better.

Dr. Phillips—I certainly should, until the sores are well.

Dr. ——— —I don't think there is any provision in the law for a physician attending a case of that kind to notify the health officer. If he should do it, he is liable to lay himself open to criticism from the family, etc. Not but what morally it ought to be done, but as the law stands, how can the health officer obtain that knowledge?

Dr. Lewis—In case he has that knowledge, he should act upon it.

Dr. ——— —The health officer is only one in ten or a hundred physicians in a community.

Dr. Lewis—It strikes me that if a health officer knows of as infectious a disease as that on a child attending school, he should take cognizance of it.

Dr. ——— —But would the law uphold him? There is no provision in the law, and nothing in the law that can be construed as covering syphilis,—while morally it is right.

Dr. Lewis—That is one of the cases in which discretionary power certainly rests with the health officer.

A Delegate—I knew that there were children in the school in that condition, and I advised all the rest of the children to supply themselves with drinking cups, and it certainly only needed suggestion to have them do it. They are very proud of it, and I think every child in the school had a separate cup inside of a week.

Dr. Lewis—There is another question, in regard to the duties of a health officer in regard to milk supply in a country town; but we hardly have time to go into that now. We may have time during the evening to have some further discussion on the question of milk. There are so many questions that come up here year after year that we can't cover them at any one session.

Before calling upon Dr. Pease, I would like to state, however, that the meeting arranged for this evening is one that will interest all of us, because I understand that Dr. Darlington proposes to discuss, to a considerable extent, the law which provides that boards of supervisors shall have the power of excluding sanataria for tuberculosis from their counties,—the law which was enacted last winter; and it is an important subject, and one that concerns all of us.

Dr. Tucker's paper on explosive oils is also a practical paper, as well as the one by Dr. Wiley. I believe that Dr. Wiley himself is not to be present, but his paper is here and will be read.

Mr. Allison—I wish to remove the impression that was given by the case cited by Dr. Wilson, our health officer, that our undertakers were remiss in their duty, for not filing a death certificate before a corpse was buried. I will say that this case did not come from our undertaker; it came from the city of Binghamton. Our undertakers are living up to the law.

Dr. Pease—I was very much interested in Dr. Clark's papers. and I may say that his method is, as far as I know, altogether new in application, but old in principle. There are several methods of vaporizing formaldehyde by forcing it in a small stream against a red hot metal surface; but the application of it to the hot air heater is certainly very ingenious and ought to be very effective.

If, as he says, he can vaporize ten pounds of the ordinary so-called 40 per cent. solution of formaldehyde in water in four minutes, he accomplishes a great deal more than almost any apparatus that I know of will do in that limit of time. That is certainly very rapid work, and therein lies the special efficiency of his method.

The formaldehyde gas in a given space produces an effective disinfection when the amount of gas is great, but if you add to a given space a small amount of formaldehyde one minute and another small amount another minute, the chances of leakage and absorption are great and the amount of gas at any one time is not as great as when the gas is poured into the room in a short space of time. His method is probably efficient on account of the rapidity of vaporization.

There is one point which Dr. McClellan spoke about which is of the greatest importance. The earlier workers in the field of disinfection by formaldehyde claimed that you should have dry gas. That unfortunately was altogether erroneous. More recent experiments, the first of which were done by Mr. Dudley, of the Pennsylvania Railroad, go to show that up to the saturation point of the air with aqueous vapor, the disinfecting value of formaldehyde increases, and I hold in my hand an abstract of an article by Esmarch, who states that steam with one per cent. of formalde-

hyde gas will disinfect furniture and clothes, etc., in five minutes.

There we have the maximum amount of humidity, that is, steam, with a minimum amount of formaldehyde, and we get disinfection.

That is the secret of the lack of success in all these experiments such as Dr. Goler tells us were made in Rochester, and that is the cause of failure in all experiments in which formaldehyde gas has failed,—the amount of moisture in the room has not been sufficient to get the actual disinfecting power which formaldehyde in capable of exercising. I must have made hundreds of experiments, and I have had results as variable as the wind that blows and it was all owing to the fact that I did not know the conditions under which formaldehyde would act best. With the proper moisture in the atmosphere we can get just as complete disinfection.

Dr. Goler—These experiments were made by men who represented the companies.

Dr. Pease—They knew no more about the proper conditions than we did at that time. The presence of moisture in the atmosphere was worked out by Dr. Dudley in the latter part of 1900 and his results were not published until 1901 and it is just beginning to be known generally that the amount of moisture present in the atmosphere determines the efficiency of the gas. You may have an excessive amount of gas and yet no disinfection if the gas is dry.

I could explain the scientific and chemical reason for that action, but it would be technical and perhaps uninteresting. All the methods of producing the gas can be lined up and determined as to their efficiency by the amount of moisture that is generated by these different processes. When we consider the use of polymerized formaldehyde, formaldehyde in solid form, and the candles, and the various methods of that kind, we can state without fear of contradiction that experiments with those methods, if there is not some additional provision made for the presence of humidity in the atmosphere, will fail. Where that extra precaution is taken, those methods are just as effective as any other. The whole question of disinfection and cleanliness comes down to the point of financial consideration. If you can get cleanliness, well and good and better than all else; but if you can't, then

depend on disinfection. The best combination is 100 per cent. cleanliness and 100 per cent. disinfection, and then you are sure.

Now Dr. McClellan spoke of a method which I believe was first used and advocated by a man connected with the Brooklyn board of health, and while I have had no experience with the method, nor have I seen any published results, I believe it is a good one. Those of you who were here two years ago will remember that I spoke of having undertaken some experiments in 1897 in the city of Philadelphia in which I poured the formaldehyde solution over ordinary chloride of lime powder which is distributed for disinfecting work, and I informed you at that time that we found that a large amount of formaldehyde gas was given off on account of the violent reaction which took place, but that we also obtained the fumes of some corroding gas which rendered the method of little practical value when materials like clothes and metal fixtures were to be disinfected. The method has been worked up and in place of chloride of lime they have substituted the oxide.

The Maine State Board of Health have recently published the results of another method of a somewhat similar character which in a way is even simpler. The results were obtained by a simple chemical method of producing the rapid evaporation of the commercial 40 per cent. solution of formaldehyde in water. The method consists in the simple pouring of such a solution upon the proper amount of crystals of potassium permanganate held in a suitable container.

It has for several years been known that for the satisfactory disinfection by the use of formaldehyde in a gaseous condition, the requisite amount of gas must be introduced into the space to be disinfected with great rapidity, and that the greater the amount of aqueous vapor present in the air, the more rapid and certain the bactericidal power of the gas.

The method as reported brings about the results according to the following reactions:

A small amount of the formaldehyde is rapidly oxidized into formic acid by the permanganate, and the great heat generated by the reaction vaporizes the larger amount of the remaining formaldehyde solution. In the presence of the excess of oxygen and heat the reaction proceeds further and a decomposition of the formic acid into water and carbonic acid gas results, and

but little formic acid is therefore vaporized. The permanganate is itself reduced to a lower oxide of manganese with the formation of potassium oxide and the liberation of oxygen.

The first reaction is so vigorous that when the chemicals are used in the proper proportion, the larger part of the formaldehyde solution is evaporized immediately, and is at once available in its maximum amount for disinfecting purposes.

Chemical analyses showed that no injurious or poisonous chemical compounds remained in the vessel, or were given off in the vapor. No injurious effect was produced in clothing, paper or metals.

The proper proportion of the two chemicals was found to be ten cubic centimeters of an approximately 40 per cent. aqueous solution of formaldehyde to 3.75 grammes of powdered commercial potassium permanganate, or approximately 6.5 ounces of the latter to one pint of the former.

Any form of container may be used which will hold the desired amount of the mixture and allow for the effervescence, but it was ascertained by experiment that a vessel made of tin which in the experiments was ten inches in diameter and about fifteen inches high gave a better result than containers made of material like glass and pottery whose walls absorb more heat. For obtaining the maximum of formaldehyde gas, and for its easier and more even distribution, it was found experimentally that the upper half of the sides of the vessel should deflect outward at an angle of about 65 degrees. With such an apparatus 80 per cent. of the formaldehyde in the amount of solution used was evaporized and available for actually disinfecting action.

This method of disinfection was tested bacteriologically on five different rooms in two buildings under a variety of atmospheric and other conditions at different seasons of the year. In all, 279 series of cultures of ten different species were used to infect 1,629 test objects. The time of exposure varied from four to sixteen hours, and the amount of formaldehyde solution used was in the proportion of one quart to 1,000 cubic feet of air space.

Of the 1,629 infected test objects containing both pathogenic or nonpathogenic bacteria, in all but 27 the bacteria were killed. Of these 27 instances, in 21 the objects had been inoculated with

Bac. subtilis spores. Of the remaining six test objects, three had been near a crack in a window where the concentration of the gas was doubtless diminished.

The method would seem to be a very simple, comparatively inexpensive and readily available method of gaseous disinfection.

The proportion of chemicals to space to be disinfected should be six and one-half ounces of permanganate of potash and one quart of formaldehyde solution to 1,000 cubic feet of space.

Dr. Lewis—The evening session will open at a quarter past eight, instead of eight o'clock.

EVENING SESSION, FRIDAY, DECEMBER 16, 8.30 P. M.

Dr. Johnson—I now have the pleasure of introducing to you Dr. W. G. Tucker, who will address you on the

TESTING OF ILLUMINATING OILS.

Dr. Tucker—LADIES AND GENTLEMEN: I am not sure that the subject on which I am going to say something this evening is one which is strictly germane to the duties of the health officer. It might perhaps be more appropriately discussed among insurance men, or representatives of our departments of safety; but if we may assume that health officers are, indirectly at least, interested in all that pertains to the public health and life, it may be fair to suppose that they will be, in some measure at least, interested in this subject.

Notwithstanding the rapidly extending employment of gas, now used in many new ways, and of electricity, the consumption of petroleum products is rapidly increasing. The kerosene lamp is here to stay. It is not going out of use very soon.

In 1902, as shown by "The Mineral Resources of the United States," published by the Geological Survey at Washington, the production of oil in the United States amounted to 48 per cent. of the crude oil produced in the world, while the production of refined oil was 72 per cent. of the total product, and while large quantities of oil are exported to other countries from the United States, enormous and increasing amounts are being used for the purpose of illuminating and heating at home.

We desire to secure your interest in this matter, and in a way, your cooperation in suppressing abuses which may exist in your

communities to the public detriment, and which may constitute a menace to life and property.

Kerosene oil or other products of petroleum may give rise to accidents, attended with destruction of property and loss of life even if the oil be of good quality. Through its incautious use, or misuse, accident may result, but the chances of accidents are greatly increased if oils of low grade, having a low flashing test, oils which emit an inflammable vapor at ordinary room temperature, and ignite at moderate temperatures, or directly take fire and continue to burn on the approach of flame, are used. Under such circumstances, the probabilities of disastrous conflagration are greatly increased, and while doubtless the larger part of the oil which is consumed in this State comes up to the legal requirements, considerable oil of inferior quality, falling decidedly below the State test, is sold. Just how much of such oil is sold, I am not prepared to say.

The Legislature in 1882 passed an act which placed upon the State Board of Health the responsibility of investigating this subject, of recommending an instrument and a test, and of enforcing the law passed in that year. Appropriations were made for this purpose, but for the last twenty years no further appropriations have been made. There has, therefore, been no systematic collection of samples or testing of the oil supplied in this State for many years.

The brands which we stamped upon barrels may correctly state the quality of the oil they contain, but they do not indicate that any official test has been made, nor is there any examination of the oil which comes into the State from neighboring states.

Now, we found two years ago, in Albany, that a good deal of inferior oil was sold in this city and in this neighborhood, but it was impossible for the Department to go on with the work at that time, although the action then taken resulted in the suppression of the existing condition of affairs. We ascertained whence this oil came, and the warnings that were promptly sent were as promptly heeded.

At that time, the summer of 1902, much oil was sold at retail in this city which had a flashing point in the neighborhood of 75 degrees.

It may be well to explain particularly what that means. The present law covering the storage and sale of illuminating oils, whether petroleum products or otherwise, (but practically all illuminating oil used now is the product obtained by refining petroleum), is a part of the Domestic Commerce Law, chapter 376 of the laws of 1896, and is essentially the same as the original law of 1882.

It provides, in section 24:

"No person shall manufacture or have in his possession or sell or give away for illuminating or heating purposes in lamps or stoves within this State, any oil or burning fluid, wholly or partly composed of naphtha, coal oil, petroleum or products thereof, or of other substances or materials emitting an inflammable vapor which will flash at a temperature below 100 degrees Fahrenheit, according to the instruments and tests approved by the State Board of Health."

And then it further provides that "no such fluid which will ignite at a temperature below 300 degrees Fahrenheit shall be burned or be carried as freight in any passenger car or passenger boat moved by steam or electric power in this State, or in any stage or street car, however propelled, except that coal oil, petroleum and its products may be carried, when securely packed in barrels or metallic packages, in passenger boats propelled by steam, when there are no other means of transportation."

But with the latter clause we are not this evening particularly concerned, since what I have to say will particularly relate to the ordinary kerosene oil used in our houses. This oil must not emit an inflammable vapor which will flash at a temperature below 100 degrees Fahrenheit, and it must be tested by the instrument approved by the Board of Health.

In 1882, the then recently organized Board of Health referred the matter to its board of analysts and the subject was specially investigated by Professor Elliott, then of Columbia College; and after an investigation of all the testers then in use, either in this country or in Europe, he recommended an instrument which is virtually the Michigan or the Wisconsin tester, as a suitable one, and the Board of Health adopted this instrument and it so became the legal instrument, and the method pre-

scribed by the Board at that time for testing oil with this instrument is the legal method today.

The terms used in the act are the only terms that have legal significance today, so that such terms as "fire test," etc., have no legal significance.

It is necessary to understand that the flashing point of oil, or indeed its ignition point either, is not a fixed point which can be determined with accuracy, like a boiling or freezing point, for instance.

The temperature at which an oil will give off a vapor which becomes inflammable or explosive when mixed with air, will depend upon a variety of circumstances, such as the kind of vessel in which it is heated, the rate of heating, and whether the surface of the oil is exposed to draughts of air or it be volatilized in a closed vessel. So that tests are not comparable unless they are made with the same instrument and are performed in precisely the same manner.

To test oil properly requires skill and experience on the part of the operator, and the fact stated explains why different terms are used in the laws of different states, for almost every State has its own law, and there are many different oil testers in use.

There is the old open cup instrument, the closed cup that was used in New York by the Bureau of Combustibles before the State law was passed in 1882, and the long line of electric and other testers used at home and abroad.

The instrument that is the legal instrument in this State is comparatively simple and is easily understood.

This (exhibiting the instrument) is merely a support for the water bath in which the oil is heated. The oil cup has a capacity of about ten fluid ounces, and the bath being filled with water, the oil cup is pressed down into it, which will throw out the excess of water, insuring the filling of the water bath. This is set in the support, and the water bath may be heated from below by a small alcohol lamp or a Bunsen burner. The oil cup being placed in position, is filled, best with a funnel, with the oil to be tested, to within one eighth of an inch of the flange, so that we have, above the surface of the oil, the vapor chamber, in which the vapor that is gradually given off as the oil is heated, collects. The cover is of glass and has two openings. Through the one,

in which we place a rubber cork, passes the thermometer, which must be accurate, if accurate results are to be obtained.

The other opening permits the introduction of the flashing jet. This flashing jet is a small gas jet. A rubber tube is attached to the gas supply and a hard glass tube drawn out to a small opening serves as a jet, and the flow is regulated so as to give a flame one fourth of an inch in length.

The oil is gradually heated. The temperature is watched and a record is made of the temperature and the rapidity of the heating. The rate of heating should be about two degrees a minute and never exceed three degrees a minute.

The first test should be made when the oil has reached a temperature of 85 degrees, and then, the rate of heating being carefully watched, successive tests are made at every two degrees up to 95.

The test is made by introducing the small jet through the small opening in the glass cover, and to a distance of about one half way from the lid of glass to the surface of the oil. It is not to be kept there. It is to be introduced quickly, and as quickly withdrawn.

The first test is made at 85 degrees. With good oil there should be no result at that temperature. Then you test at 87, 89, 91, 93 and 95, not heating your oil too rapidly. At least four minutes should be given for the ten degrees; five is rather better, because the oil must come to the temperature of the water, and the thermometer must tell the temperature at which the oil actually is.

Then, from 95, you test at every degree until 100 is reached, and then from 100 every two degrees until it flashes.

What is a flash? Not an explosion which blows off the top of the instrument, but just a little blue flame which momentarily passes over the surface of the oil. It is desirable to have the instrument in a good light so that you do not get a reflection from the surface of the glass. The Wisconsin tester had a metal lid. This glass lid is a great improvement, but you must have a good light so that you can see the bluish flame which spreads over the surface of the oil. A mere enlargement of the flame shows that there is a little vapor there. There must be a flash, not an explosion or puffing out, but a spread of a light blue flame over the surface of the oil,—that is a flash.

It is an arbitrary point. It must be obtained with this instrument or one like it. You must make the test in this way.

If you should go back and make another test of the same oil, and bring it up to 100 or 102 degrees, at which it flashed in the first instance, you may find that it will give a very strong flash at that temperature in the second test, because you have not made the intermediate tests. It must be tested every two degrees from 85 up, and that will consume some of the vapor. On the contrary, if you make your tests too frequently, or if, having passed the point at which the test should be recorded, you then test at the next two degrees, and have thus consumed what vapor has formed, you will get no flash until perhaps four degrees higher; so that this instrument, the principle of which is simple, must be used intelligently and as prescribed, else the results will not be reliable, nor can they be compared with those obtained with instruments of other construction and by other methods.

Now our law requires that oil shall not, in this instrument, when tested in this way, emit an inflammable vapor at a temperature under 100 degrees.

The ignition point is found by removing the water bath and supporting the oil cup by its collar and heating the oil direct. The thermometer hangs from a support, so that the bulb is covered, and tests are made at every five degrees up to 300 degrees, by bringing the flashing jet directly in contact with the surface of the oil; and the law provides that oil which shall take fire and go on burning under 300 degrees may not be used on cars, steamboats or the like, but for ordinary household uses the 100 degree flash test is the standard test.

Now, benzines and other light oil products will flash at ordinary temperatures. Part of their safety, for there is a kind of safety attendant upon their use, is due to the fact that they emit such a great volume of vapor at ordinary temperatures that there is no air mixed with it, and of course in order that the vapor of oil or any combustible gas shall explode there must be a mixture of the vapor or gas and air, and within certain limits.

Now, some oil that is sold today will flash at 75 degrees. Here we have an ordinary room temperature and in many lamps the construction is such that the oil cup gets very hot, and the temperature of the oil is frequently, and perhaps generally, above

this point, and such oil will ignite at a comparatively moderate temperature, whereas oil that will stand the State test will not ignite much below 125 degrees. You may not be sure of the fact until you have tried the experiment, but if you take State test oil and put it into a cup at any ordinary room temperature and thrust a lighted match in it, it will go out just as if thrust in water. Oil that is emitting vapor in such quantities that it will immediately flash or take fire on the approach of flame is dangerous and hazardous stuff to employ, and yet some such oil is used in our houses. The probability of disaster is greatly increased when such oil is employed. If we fall down stairs with a lighted oil lamp, it is an accident which may result in death or a conflagration; but still oil that will come up to the State test will not in most cases ignite under these circumstances. Of course if the lamp is broken in such a way that the oil is thrown over the carpet or on the floor, and the wick not blown or put out, and it strikes upon the oily surface, it will set it on fire; but ordinarily, if the lamp is overturned and the oil flows over the wick it will put it out.

Ordinary State test oil will not ignite usually on the approach of flame, when in bulk, under about 125 degrees. This is deemed to be a sufficiently high temperature, and I am not aware that there has been criticism here. You might say why not have a flashing point of 110 or 120, and a burning point also, which is now prescribed by law, but for various reasons this would not be advisable. Such oil would cost much more and would not burn as freely and would be disadvantageous for many reasons. Take it altogether, and there is a general consensus of opinion upon this point, our present law is a good law, and the standard is a fair and safe one; but oil of lower grade is hazardous oil to use and such oil ought not to be employed.

We hear a good deal about lamp explosions. I want to say one word about that. I have investigated a good many "explosions," and I have never been sure, in any case that I have myself investigated, that there was an explosion. I do not say that explosions of lamps may not occur, but they are very unlikely to occur. Oil is not explosive *per se*, nor is its vapor, only when mixed with air and in certain proportions. It must not be all vapor, nor must there be too little vapor, but it must be

air and vapor mixed within certain limits. Most accidents are called explosions. If a lamp falls on a redhot range or is thrown down stairs and a conflagration follows it is reported generally as an explosion. Accidents may happen in such ways, but they are not properly explosions. If the lamp or the oil holder is constructed of metal, as is generally the case in ordinary parlor lamps at least, and the construction of the burner and the shade are such as to reflect the heat so that the lamp itself gets hot, it may be that a greater amount of vapor is formed in the lamp than can be consumed, and this may give rise to some slight pressure within the lamp, and you may have that flaring up of the flame which sometimes causes the evolution of large volumes of black sooty smoke which do a great deal of damage, and if no one is at hand to put out the lamp or turn it down, you have a conflagration; but that is hardly an explosion.

And so in lamps that are fed from higher receptacles, on the student lamp principle, you may have, through some fault of construction or improper tending of the lamp, an oversupply of the oil which will cause an uprising mass of flame, but that is hardly to be called an explosion. Cases of lamp explosion proper are, I think, much rarer than they are commonly supposed to be.

Now, we hope this is a subject in which you will feel interested and that you will do what you may in your various communities to create a sentiment that may lead to an appropriation by the Legislature for an investigation of the oil supply of the State, or at all events to the discussion of this subject, which is an important one and which has been long neglected; and we should be glad to have reported any cases of accident that may happen and to investigate them if possible ourselves, and to receive any samples of oil in such cases, or indeed in any case in which you may desire to have oil tested. Such samples should be sent in quantities not less than one quart, and may be sent to the Department, or directly to me, and they will be received at any time and examined; and reports of accidents that may occur from the use, or even the abuse of illuminating oil, we should be glad to have reported and aid you in investigating.

A circular that was printed last summer, being form 110, on the testing of illuminating oils, with an abstract of the law, is

on the table in the anteroom, where those who are interested in the matter may obtain it.

Dr. Johnson—Gentlemen, this is an interesting paper and one of great value. This is now open for discussion and any of you gentlemen who desire to speak upon the subject will now have an opportunity.

A Delegate—What are the points in regard to gasoline? It is related to the subject, but not precisely the same thing—that is, the regulations if any, that are necessary in order to prevent accidents from that source.

Dr. Tucker—It was not my intention to go into details concerning the extraordinary uses of oil and the legal penalties and other provisions of law, but the Domestic Commerce Law permits the use of naphtha and other products of petroleum which will not stand the flashing test required by section 24, for illuminating or heating purposes in certain cases, as in street lamps apart from any inhabited house in which the vapor is burned. There are other exceptions and exemptions of that kind in the law, but I did not take time to read them, since in what I said had more particular reference to the ordinary grade of kerosene oil, such as is burned in ordinary house lamps, and not in gasoline machines and the like.

A Delegate—Is there any regulation that is required to be adopted by the Board of Health, in regard to gasoline?

Dr. Tucker—I can not answer that question. The Commissioner may perhaps do so.

A Delegate—Is there any regulation with regard to the storage of gasoline by the Board of Health?

Dr. Lewis—Not in our Department, no, sir. That is left entirely to the local boards of health, to make regulations which they deem necessary.

A Delegate—Are there any recommendations?

Dr. Lewis—My recollection is that there is not in our manual.

A Delegate—I would like to ask what is the flashing point of gasoline as used in the larger automobiles.

Dr. Tucker—Strictly speaking, such products of petroleum as gasoline, naphtha and benzine, terms which have a precise meaning

in the wholesale trade, but which we use interchangeably, have no flashing point on this instrument, because they will flash at the freezing point. They are emitting inflammable vapor at all ordinary temperatures; so that their flashing point would not be determined in this manner or by this instrument.

A Delegate—Would these still be, then, prohibited by the law, or did you say that the law didn't apply to these?

Dr. Tucker—It would prohibit their use in lamps for illuminating or heating purposes, in lamps or stoves.

The legal points involved here are rather complex, and these sections of the Domestic Commerce Law are quite voluminous, but when we reprinted this circular, the essential parts concerning oils used for household purposes were submitted to the Attorney General, and approved by him as being the present law, not superseded by any subsequent legislation.

A Delegate—I would like to ask Dr. Tucker, for my own information, if there is more danger in the ordinary glass lamp, used around the kitchen, etc.—if there is any more danger in using one with the oil partly filled or nearly out than if it is kept filled. I know the lamp often gets very hot below the burner, and we oftentimes burn the lamp all night. I have often wondered about that.

Dr. Tucker—I do not think there is very much more danger, doctor; I don't think it makes much difference.

Dr. Lewis—It will now be our privilege to listen to a paper by Dr. Thomas Darlington, president of the board of health of New York city, upon "Sanatoria for Consumptives."

SANATORIA FOR CONSUMPTIVES.

By Dr. THOMAS DARLINGTON.

Dr. Darlington—MR. COMMISSIONER AND MEMBERS OF THE CONFERENCE: What I have written, I am sorry to say, was written rather hurriedly, on account of my time being very much filled up and is not on sanatoria generally, but so far as relates to New York city.

The death rate from phthisis in New York city in 1893 was about thirteen per cent. of the total number, or 9,287 deaths. During the present year this number has been increased and the

death rate has risen. From January 1, 1904, until noon today (December 16th) 12,176 new cases have been reported.

These cases added to those already known and making allowance for those cases unreported, and those who died during the year, there are probably within the limits of Greater New York between 25,000 and 28,000 cases.

With this increased number of cases, and the disease again on the increase, it is the moral obligation of the board of health to make every effort to prevent the spread of the disease, and the cure or aid of those now suffering from it.

With this idea in view, early in the present year the board of health opened a clinic for the care of these cases—the object of the clinic being to secure observation of the cases, to teach them how to get well (if in the curable stage), and if not, at least how to live with the disease, and at the same time not communicate it to others. Of the first class,—those that may be cured, the vast majority are compelled to work for a living, and obtain a livelihood but from day to day. These incipient cases if they are ever to be cured must be taken from the city to some sanatorium, where they may receive the proper treatment. For with the conditions under which they live sooner or later they must break down, and the cases become chronic with no hope for themselves, and they become not only a menace to the community, but many in the end a charge upon it.

The essentials in the care of a case of pulmonary tuberculosis are:

1. Food.
2. Rest.
3. Fresh air.
4. Sunlight, and last and least,
   Drugs.

But the reasons for the establishment of such a sanatorium is not only the obligation to the patient and the municipality, but reaches further.

In the course of a year, nearly every physician in the city has at least one or two cases of phthisis that he desires to send into the country.

These belong for the most part not to the wealthy class, but to those who find it difficult to obtain the money necessary to get even a few weeks' vacation.

They usually do not go far from home, because of the railroad fare, but find their way into the farmhouses of adjacent counties, notably Sullivan county.

The majority of such cases have only the casual observation of a physician, and are uninstructed as to the proper care except in so far as it relates to themselves.

They are told not to be out late evenings; to go to bed early; to drink plenty of fresh milk; to eat eggs; not to exercise too much; not to get the feet wet; to wear underwear according to the season, and other instructions of a similar character. But few indeed are those who go into the farmhouses of the country, who are careful not to expectorate upon the grass (in this way they may infect the cows and other animals of the place), nor around the house; nor to use a cup or flask for such purpose; nothing is said of washing the hands or of soiling the clothing with expectorated materials. No instructions are given to them to inform the farmer of their condition—that the cups and other utensils used by the patient may be scalded. Nothing is said of the wash, or bed linen being handled as little as possible in a dry state, and no directions given as to sweeping of the carpets, or cleaning of the rooms occupied by such consumptives. Here indeed is an opportunity to spread the disease among the small villages and the farming classes throughout the State; not only the immediate family, but to his man servant, his maid servant, his ox and his cattle, and the stranger that is within his gates. How are such conditions to be remedied? It seems to me only in one way.

By the establishment of private and municipal sanatoria for the segregation of these cases, and by the education of the public that the best and most scientific treatment can be obtained in such institutions.

The present law passed two years ago and known as the Goodsell-Bedell law, prevents the establishment of any sanatorium for consumptives in the State of New York, whether private or municipal without the consent of the board of supervisors of the county and of the town board where such an institution is to be established. This law is practically prohibitive.

Many times during the year have I endeavored to locate a site

for a municipal sanatorium, and much money and time have been wasted in this endeavor, but as yet no proper place has been secured. I have no doubt consents could be obtained in some sections in inaccessible and waste places totally unfit for the purpose intended. Such an institution must be placed in a healthy locality, free from dust, where the patient can be kept cool in summer, and where in winter they will not be exposed to the north and west winds, and where it is somewhat elevated. Such a place must be accessible not only for the transportation of the cases, but also that their friends may occasionally see them, and that supplies of fresh food may be obtained.

Economy is also a question for even municipalities. No matter how large, they have no money to waste. Some of the most absurd objections have been made to the establishment of such an institution, and show only the most rudimentary knowledge on the part of town boards.

For instance, the claim that the dead would be constantly carried away from such a place and that would be a great menace to the community. In any institution for incipient cases, and such has been the only one proposed, there are no dead, and even if there were, they could not possibly effect any neighborhood.

It has been conclusively shown that such a sanatorium for consumptives is not only not dangerous to the community or neighborhood in which it exists, but that the death rate from pulmonary tuberculosis has fallen in such places.

I therefore appeal to you for assistance in case the city of New York should be unable to obtain a proper site for such an institution by the time of the opening of the Legislature. I trust that those present will aid in the repeal of the law which makes the establishment of such an institution impossible, and that the consent for the same be placed with the State Commissioner of Health.

Thus the rights of all parts of the State are protected; then there may be hope that something will be done to save the life of the poor consumptive who is unable to help himself and at the same time to remove to a certain extent the present menace to agricultural and suburban classes.

Dr. Lewis—This paper of Dr. Darlington's opens up for discussion an exceedingly important subject, as important to you as to the citizens of New York city. I trust that there will be

a free interchange of opinion upon the subject and that the way may be cleared, or partially so tonight for a repeal of the law, which has always seemed to me unjust and unfair to the citizens of the large cities and an inhumane measure in its actual results to the patients.

We are willing to provide for the benefit of every other class of patients in any locality in the State, but when it comes to the most needy and most worthy class for this kind of treatment, we are shut out by the law which was passed last winter. With this idea in view, I invited the commissioner of health of New York city to come and place the matter before you, and it is now open for discussion.

A Delegate—Last year I visited Saranac Lake, the Adirondack Cottage Sanitarium, as I had a member of my family there, and I became very much interested in the work, and I am informed by the resident physician in charge, Dr. Brown, that since the Adirondack Cottage Sanitarium was started seventeen years ago there has never been a case of tuberculosis contracted from any of the institutions there; and not only that, but some of the nurses and attendants have been there during the seventeen years, and it is the safest place in the whole Adirondack region if you want to steer clear of the disease.

I have thought a great many times that this was a very improper law, that there should not be a sanatorium established anywhere without the consent of the board of supervisors. As a rule boards of supervisors are made up of people who know little or nothing of the methods of treatment of tuberculosis. I think it is our duty to use every means in our power to influence legislation for the repeal of this law.

In this connection I would like to ask Dr. Darlington what if any bearing these circulars have that are being sent out purporting to come from the Postgraduate School in New York regarding the treatment of tuberculosis with Dr. Russell's emulsion, that they are able to go on with their work except to report twice a week and take this emulsion, and some of these people were in the second or third stages of the disease. From all these reports I have got they all got well right in the city of New York.

Dr. Lewis—I think we had better limit the discussion to five minutes each, so that you can all have a chance to speak.

Dr. McClellan—I want to give you a little statistical information in regard to the vital statistics of Saranac Lake. We have there an average of about 600 consumptives continually, and during the last eight years there have been but thirteen deaths from pulmonary tuberculosis among the resident population of the village, a village whose population eight years ago was 2,000 and today is about 4,000. This is an average of less than one in 22 of the total number of deaths for the eight years last past. The total mortality of the village of Saranac Lake for seven years up to last January (I have the figures worked out exactly for this, except that I know there has been but one death from pulmonary tuberculosis this closing year, that is among the resident population) the average mortality for the seven years per 1,000 was 14.56 per annum.

I only wish to state those statistical figures for your information, to show how very dangerous it is to have a few consumptives around.

Dr. Lewis—Dr. McClellan, will your assemblyman favor the repeal of that law?

Dr. McClellan—I don't know. If I have any influence with him he will.

Dr. Lewis—We will leave it to you, doctor.

Dr. McClellan—I shall be down here some time this winter and if I can contribute anything to assist in the repeal of that law I will do so, for I think it a disgrace for any civilized community to enact such a law.

Dr. Lewis—We would like to hear from Dr. Craig.

Dr. Craig (of Albany)—I want to offer my apologies for not appearing to discuss Dr. Curtis' paper last night. I was in the audience for a while but was called away, much to my regret.

I think we are all in favor of sanatoria, although I think it is possible to carry an idea like that too far. There has been a natural tendency for the last ten or fifteen years for the average death rate from consumption to decrease in our city. I happen to have in my pocket a paper which was prepared for another meeting tonight, and in which the members of this conference may be interested. It gives the number of deaths by months from consumption in the years from the year 1870.

I think in the early days, the first ten years, the statistics are not very reliable, but about the time of the organization of the board of health by State law, in 1895, the statistics were fairly accurate, as accurate as they ever are in any community.

In 1883, 1884 and 1885 the number of deaths from consumption in this city was 346, 323 and 307, and as we go on for the next few years the total deaths for those years were always over 300. Now, about the year 1894 or 1895, ten years ago, the average number of deaths decreased. In 1893 there were 256 deaths; in 1894, 295; in 1895, 284, and so on. About the year 1898 they had fallen to 246; 1899, 243; last year, 223, and this year there are about 220. In other words, the average number of deaths for the last three years has been a little over 200, and the average number of deaths fifteen years ago was something over 300. There has been a decrease in the number of deaths in this city of 33 per cent. during those years.

Practically nothing has been done here. We have our city ordinance and it is posted in cars and on the public buildings. We have only the usual advertisements that consumption is a communicable and contagious disease, which has appeared in the newspapers, but nothing else has been done. We have no institution here for the treatment of consumption.

It is probable that during the next ten years there will be a further decrease in the number of deaths.

The question of sanatoria seems to me always to be a doubtful one; we can carry this very easily to extremes. The State has set a very noble example to the local communities, and it is well to do so. We hope they will go further, but not to the extreme. It is different from the insane,—where there is a constant increase in the number of the insane throughout the State, there is a natural tendency to decrease in cases of consumption. Perhaps every local community ought to have some place for the treatment of consumptives, but the plans for such purposes ought to be limited; they ought to be used more for the purpose of instructing or teaching people what can be done by open air treatment and food than to attempt to provide more places for the treatment of cases of consumption.

I think something can be done by local boards being more stringent in regard to the handling of cases in private houses;

but the publication of the fact that consumption is communicable and contagious will put people on their guard, and that fact alone has resulted in a marked decrease in the number of cases of the disease.

I thought you might perhaps be interested in these statistics as they are quite valuable. I thank you.

Dr. Veeder—My remark has practically lost its force now inasmuch as it does not tally with that of my colleague from Saranac Lake. I was going to say that from my personal observation his statistics were not quite accurate, as when they got cases from outside points they sent them home to die. I happened to be the recipient of some of those cases.

Dr. Lewis—I understood Dr. McClellan to be talking about permanent residents.

Dr. McClellan—That is right; it was not intended to cover any of the persons who came to Saranac Lake in consequence of their being affected with tuberculosis. This record is intended to show not merely the native population, but those who came there in the ordinary course of life, not affected by the disease.

Dr. King—It seems quite necessary in cities that they should have places where they might send tuberculosis cases. It seems strange to me, in trying to seek for places for these cases, that a State which proposes to spend $100,000,000 for canals is too poor to buy, say, a township to use for this purpose. There is nothing difficult, it seems to me, about the Empire State purchasing a township and owning it for this purpose.

That is the point that I would make,—if the State has got $100,000,000 to spend for canals, to transport material through it, I think it might have a little to place the sick in a position where it would be beneficial to them.

A Delegate—About three or four years ago I was asked to discuss the subject of the open air treatment of consumption before the State Conference of Charities, and the request grew out of the idea on the part of some of those who were connected with the department of State work, that there is involved in this question really the formulation of a proper policy to go before the public with,—that is, if the idea that is foremost is simply quarantine, to herd together, out of the tenement house districts all persons who have that disease, that is altogether a

different proposition from formulating some system that will stand before the public with reference to the possibility of a cure; and with reference to that point (to put it in a nutshell,—in five minutes it is impossible to go over such a subject) after considerable observation it occurred to me some years ago, that it was very largely a question of temperature. If you keep the bacteria at a certain temperature they are capable of producing toxins, and the temperature at which the baccilli of tuberculosis begin to do that is 99 degrees, and below that temperature it fails, and for a long time, as in test tubes, it grows very slowly in the air passages,—it may take weeks and months; and if during that time the patient has been kept properly, the bacillus becomes dormant in the air passages and the power of the body to overcome infection at the end of a year or two destroys it absolutely.

It is largely a process of education. I have seen persons who have remained well for fifteen years who were on the verge of having a cavity, and certainly night sweats and hemorrhages.

That formulates a policy. It puts the thing under control, and that is the truth of the matter. It arranges things so that it is possible to appeal to the public with reference to it in a different tone and a different way from the idea of quarantine. It is a thing that is full of hope and promise and puts altogether a different aspect on the case. The editor of one of the Buffalo papers wrote to me with regard to that paper before the Conference of State Charities, saying that they were very anxious that the appropriation for the State sanatoria should go through and that this plan would make it possible to have cures in any part of the State without reference to sanatoria, and they rather wanted it not to be discussed for that reason. My answer was this, that it was the truth of the matter and it would call forth a policy which would enlist the support of the Legislature and would cause a substantial advance and be the real thing. And from what I have seen I am satisfied that it is on the line of the truth.

Of course the forced feeding and all that comes from the person affected only. It stands on two legs; it is not a thing that stands on one foot; but the more it is looked into and is studied, the more we will see that in dealing with incipient

tuberculosis, we can put altogether a different aspect upon the whole question; so that in future years the idea will have become so spread among the public that you will have these advanced cases only occasionally in the tenement house districts, and even there, with the right kind of information, it will reach even to that point.

Of course at present it is a humane idea to take people from surroundings in the slums of New York and give them a chance for their lives, whether they get well or not; but if there is a real policy in regard to it, it will be a question of a different character. There will be no question of the consent of the backwoods counties, where they are ready to reject anything.

Dr. Goler—Mr. Chairman: A great many years ago one of the old prophets said: "Can any good come out of Nazareth?" It is my purpose to tell you that some good may come out of Rochester. We had a smallpox epidemic,—some good may even come out of an epidemic of smallpox. It is my purpose to tell you what good may come out of a smallpox epidemic. I recommend my remarks to my friend, Dr. Scott.

At the end of this epidemic of smallpox the authorities were ready to give us a smallpox hospital and when that was built, at a cost of some $60,000, we had no smallpox to put into the smallpox hospital. But the smallpox hospital was not built to take care of smallpox; it was built to take care of tuberculosis, and after the smallpox hospital had been built for at least two years we finally induced the authorities (they didn't need very much inducement, either) to permit us to use that hospital for the care of patients suffering from tuberculosis. They were willing to give us the building and equipment, and under the excuse which the smallpox epidemic furnished us for spending money, we occupied the building for tuberculosis. They didn't give us any money to take care of the patients, and we got some philanthropic friends who were willing to give us the money to take care of the people so far as their support and board were concerned. We opened that hospital for tuberculosis and it will take care of about 60 patients. We opened it last May and it has taken care of 25 patients since then, and I think, so far as Dr. Darlington is concerned, that Rochester and perhaps Monroe county, because of the presence of the tuberculosis sanatoria in

its midst, may help him in passing such a bill as he desires to have passed for the relief of the poor tuberculosis patients in New York.

I think every sanatorium ought not to be looked upon as a sanatorium for the cure of tuberculosis patients alone, but the sanatorium is a school for the treatment of tuberculosis, and out of that establishment there goes a quantity of education which the people might not get in any other way.

We do the same thing for our tuberculosis patients in the way of feeding that we do in the matter of disinfection. We are a standing protest against formaldehyde and we are a standing protest against milk and eggs,—we give our patients four square meals a day and no medicine whatever save cathartics. We require them to rest and give them moderate exercise.

Dr. Lewis—The question is still before you for discussion. It seems to me very easy to talk about fresh air and sunlight in a model place like Rochester.

A Delegate—Dr. Darlington was talking about getting some place away from the north and west wind. Up in my country we think a west wind is the best for those cases, in Schoharie county. We generally get the best results and they feel the best when those winds prevail.

Dr. Phillips—I have been talking a good deal, but I live up on the St. Lawrence river, the majestic St. Lawrence, and there is no finer place in the State of New York than the St. Lawrence. There are at the present time three cases of tuberculosis in my jurisdiction, and I don't believe there is any power in the world that would induce them to leave their homes and go into the Adirondacks or even go south. As far as the location is concerned they seem to be perfectly satisfied with it, and yet in my judgment, as far as temperature is concerned, I think there is not a place in the State of New York which is so positively injurious to people with tuberculosis as St. Lawrence county upon the shore of the St. Lawrence. But you can't get them to leave home and go away.

Dr. Lewis—It is about time to hear from Buffalo.

Dr. Greene—Mr. Commissioner, I do not think I can add anything to what has already been said. It seems to me that there

is a growing sentiment against the man who lives in the country allowing people to come to his house and board in the summer with tuberculosis. There is no doubt that there is also a campaign of education going on whereby the person who goes to the country is more apt to take care of himself and protect those who surround him than there has ever been before.

I am a thorough believer in the sunbeam and outdoor treatment as you all are, but the question is whether it should be at home or in some institution for that purpose. It seems to me that when this law was made the Legislature knew they were selling a gold brick to the citizens of the State of New York, because it seems to me that men who voted intelligently upon that subject would know that a supervisor would not vote to put one in his town, no matter where it was situated, unless the consensus of opinion in the town where he lived was in favor of it. That is my experience with men in the other end of the State, and I presume they are the same all over the State; and there comes in question that same campaign of education, of getting the right thinking people to use their influence with the supervisor to get him to do what is the right thing to do. I am sure that, as far as any personal influence I may have is concerned, it would certainly be cast in favor of repealing this law, at any time it is thought best to have a bill for that purpose introduced.

Dr. Darlington—The experience at Saranac is just the same as at Falkenstein and a number of places in Germany. There have been fewer cases with sanatoria there than in other parts of Germany.

So far as New York is concerned, there would be less still. There would be absolutely no danger, because we already have a place for consumptives in the city of New York, and every person who comes into that place for treatment must follow all the directions, whether he likes it or not. In the sanatoria at the private places throughout the State patients are privileged. They are educated in a certain way, but they are not compelled. We compel our patients to do everything that is necessary to comply with the law, because when we take patients away with us, they are arrested, they are forcibly removed from the house, and may be put on a bread and water diet if necessary.

You speak of changes of temperature. We have one place on North Brothers Island, and I think the changes are as great there as in any place in the world, and yet they get better, but not as quick as they would if they had fewer changes. My experience in that line takes me to Arizona where I spent some years and where the patients died rapidly. Only those in the third stage should go there,—it was better for them because they left with less regret. I remember that on the day before Christmas my thermometer registered 109, and yet there was two inches of ice on the horse trough that night. I find that the changes of temperature are not beneficial. The temperature is like summer and in a few hours it is very cold.

The idea in New York is just the same as has been expressed by several gentlemen,—education. The idea of the clinic, where we now have 2,600 cases on hand, who come there daily or very frequently to be educated, and that is all we try to do,—teach them to sleep with the windows open, use a cup or some receptacle to spit in, and wash their hands,—the ordinary rules of hygiene.

Those people are getting well there in New York, but a great many would do better in the country. The idea of the sanatoria in the country would be rather to educate the people. Suppose for instance we could educate the people, where we have this 2,600, we could take 300 of them to a place of that kind for a month where they would get a start and get educated.

Of this clinic, 60 per cent. can not speak the English language. It is difficult to educate people like that. We are up against conditions different from any conditions elsewhere in the State. We have all of our circulars printed for these people not only in Italian, but in Hebrew and in four dialects of Slav and in Chinese, and that is necessary. We must take all of these cases and they must all be educated.

So far as the fall in death rate is concerned, that has been so for sometime, and I think it is due to the sanitary education of the people and the better general sanitary conditions. We don't want to send people up in the country that we can't educate and do anything with. We have got places for the dying right in New York city. There are plenty of beds for those that can not recover and cannot get out of bed.

In regard to trying to buy a township,—I have tried it. I have tried to buy more than a township, but the price was too high.

I don't think there is any way to get a proper place,—a place that is really a benefit so far as fresh air and the general sanitary conditions are concerned,—without having this law repealed.

I have no doubt they would let us open sanatoria on the Jersey Meadows. I have had an offer to go up in the Highlands, away back where you could hardly get through the woods, where there are no roads and where the wood was all cut off on the sections, and they said they would give us the land. but it was a God-forsaken place where no one would go. It must be more than a mere place in the country. There must be something pleasant about it, when you take persons away from their homes.

So that, after all, a place in the country is for the education of the public, where we can give them a good start. Sometimes it only requires a few weeks to change the whole condition; and that is all we ask.

I thank you very much for your kind attention.

Dr. Lewis—The Department recently received the following resolution, which was passed by the Franklin County Medical Society, and was transmitted among others, to the State Department at Albany:

"*Resolved,* That this Society respectfully requests that the State Commissioner of Education urgently consider the advisability of public school instruction in the necessary hygiene for the prevention of tuberculosis.

"*Further resolved,* That a copy of this resolution be transmitted to the New York State Medical Society, the State Department of Health, the New York State Medical Association and the National Association for the Prevention of Tuberculosis."

I would be pleased to have an expression of opinion from the Conference regarding the advisability of our considering that resolution and taking action thereon, as far as we are able.

Is there any gentleman here belonging to the Franklin County Society? Perhaps he could give us the history of the resolution.

Dr. McClellan—Mr. Commissioner, there are one or two other gentlemen here that belong to the Franklin County Medical Society beside myself, and I beg to say that we have talked this

matter over, and have refrained from making any suggestions as to what should be done, but simply felt that, possibly, something might be done. We did not wish to do as the temperance people have done,—to get in a lot of stuff in the school curriculum which would be an embarrassment in a course of study which is already overwrought; but at the same time it was thought that possibly some elementary matter might be introduced, if the Commissioner of Education should have it brought properly to his attention, and we thought the proper way to do that was to refer it to the various sources that are named in the paper.

Dr. Lewis—Let me put this in another way: I would like to have the sense of this meeting regarding the advisability of furthering a movement of this sort.

All whose judgment would approve of such a course, if the proper details could be arranged, will please signify it by holding up their right hand.

(The delegates unanimously signified their approval of the movement.)

Dr. Greene—You had reference to changing the law again?

Dr. Lewis—No; in reference to having some instruction given in the public schools.

Dr. Greene—I would vote for that.

Dr. Lewis--I suppose you are all in favor of having the law made humane at least in regard to homes for tuberculosis patients. I cannot conceive of anybody except someone who is insane on the subject of the contagion of consumption, or selfish regarding the possible effect upon the value of his property, who would favor the continuance of that law upon the statute books.

Dr. Phillips—Would it be out of order to take the sense of this Conference in regard to repealing the present law in reference to sanatoria, upon the statute books?

Dr. Lewis—No, sir.

Dr. Phillips—Then I move that there be an expression of this Conference taken, at this time, in regard to that law.

(The motion was duly seconded.)

Commissioner Lewis—All who are in favor of the enactment of the law which has been discussed, repealing the present law upon the subject, will please indicate it by rising.

(The motion was carried unanimously.)

Dr. McClellan—I would say that the Essex county board of supervisors, of which I happen to be a member, lately gave consent to such an institution (this week) in the village of Saranac Lake. It is in the course of construction.

Dr. Lewis--The law which was repealed by this one left the approval of the site to the State Commissioner of Health. I had that law enacted myself, in order to protect the interests of the people in the locality; and we wanted to be in a position where we would not be deluged with complaints, where an institution should be located,—we preferred to hear the complaints beforehand. I never heard of any trouble or any complaints of any institutions that were located while that law was on the statute books; but the present law is working a great injustice to a very large class of people who can not be taken care of, and can not be sent to Essex or Franklin county. They must be kept nearer home.

Dr. McClellan—The town of Liberty passed some ordinance, trying their utmost to prohibit the patients at the Liberty institution from even walking their streets. I don't know exactly what they did, but they did something of that kind.

A Delegate—Will this resolution that has just been passed aid materially in the passage of that law to repeal the present law, or is there something more that each member of this conference can do for the repeal? Will that resolution reach the Legislature and have the effect desired?

Dr. Lewis—See your Assemblyman.

A Delegate—I am not personally acquainted with him.

Dr. Lewis--You know who he is and know someone who knows him.

Dr. McClellan—I am personally acquainted with Senator George Malby. He is from our district.

Dr. Lewis—Dr. Darlington assures me that this resolution will reach the Legislature all right.

We have one other paper, by Dr. Wiley, Chief of the Bureau of Chemistry, United States Department of Agriculture, who hoped to be present, but being unable to do so, he has sent a short paper, which will be read by Professor Tucker.

(Dr. Tucker read the paper by Dr. Wiley, as follows:)

THE ATTITUDE OF THE HEALTH OFFICIAL TOWARD FOOD ADULTERATION.

By H. W. WILEY, M. D.

The subject of food adulteration may be discussed from many points of view. Usually it is either the consumer's or the manufacturer's point of view. The attitude which the public health officials should take on food adulteration is one of the highest importance. It is true I think that the attitude of the public health official perhaps relates to the least important part of food adulteration, namely, the addition to foods of bodies injurious to health or the abstraction therefrom of healthful ingredients. Assuming, for instance, that glucose is a wholesome food, which I believe is the view of most hygienists and chemists, it follows that the use of glucose as a substitute for honey would not be a matter of control by the public health official, although it would be a food adulteration of the most reprehensible kind. Again, the abstraction of the cream before the making of cheese and the substitution of a cheaper fat equally as wholesome, as butter fat, would likewise not be a matter over which the public health official would exercise the proper control. It is evident that the forms of food adulteration which appeal more particularly to officials of this kind is that which adds to the food some injurious substance or some substance of a neutral nature which throws an additional burden upon the excretory organs. Such a substance in itself might not be deemed injurious and yet its long continued use might so overwork some excretory organ as to produce premature exhaustion and disease.

In the few remarks which I shall have the honor to present on this occasion I shall call especial attention to the addition to food substances of colors and antiseptics. The idea of adding an artificial color to a food is to cause a food product, as a rule, to imitate a natural product of a higher quality. I can best illustrate this by a most familiar example, namely, the artificial coloring of butter. It is well known that especially in the spring months, as in June, when the milk cow has access to green pastures and especially to clover, the cream has a beautiful amber tint and this is imparted to the butter made therefrom. On the

other hand, in winter time, especially where cows are improperly fed, the cream becomes almost colorless and the butter is almost white. For many years it has been the custom to add to this white butter a yellow coloring matter, causing it to resemble more or less closely the tint of the June butter so highly prized. The practice of artificially coloring butter, however, did not stop with this. It has extended even to the coloring of June butter and to the corruption of the public taste. Even June butter is no longer sufficiently colored to appeal to the corrupted taste of the buyer, but deep yellow tints are looked for, as though these in themselves were marks of excellence.

In the early practice of butter coloration a vegetable color alone, such as anato was employed, and I think it could perhaps be truly said in this case that this coloring matter, being, as it is, related to chlorophyll, and one which would be naturally taken in the food, could not be considered injurious. Such vegetable colors undergo oxidation in the tissues and doubtless contribute in a small degree by this oxidation to the supply of heat and energy. The progress of this seductive practice, however, soon rendered it advisable to use a cheaper and more miscible substance. The art of the chemist was not long in discovering that certain azo-dyes or coal tar products offered a tint of this kind in great abundance and at a low price. It has come to pass at the present time that where not specifically forbidden by law these colors have taken the place of the vegetable dyes at first employed. These azo-dyes and coal tar derivatives are not oxidized in the tissues as are the vegetable matters. They contribute nothing to the supply of heat and energy and they become a burden upon the excretory organs, especially the kidneys. While many of them are known to have no direct tocsic effect and therefore could not be objected to for this reason, it must be admitted that the long continued ingestion does not seem fair to the organism already burdened with all it can do in the excretory line. In other words it can not be regarded as entirely harmless that for years together such dyes as these should form a part of our food, and in this country it has come to pass that you can not, without special favor, and even then with difficulty, secure a supply of uncolored butter. In the hygienic experiments which we have conducted at Washington we have been able until the

present year to secure by special order uncolored butter for our use. The two firms which supplied us with this butter in former years when asked this year to furnish the supply, both declined on the ground that the quantity made was so small, simply the amount which we ordered, that it did not pay them to make it. For the past six weeks we have sought in vain in the markets of Washington and in manufactories nearby to secure a sufficient quantity of uncolored butter for the uses of our hygienic table. This is certainly a sad comment upon the condition of affairs in the United States as respects the coloring of butter.

There are other colors, however, which do not stand on so favorable a plain as those used in butter coloration. They may be classed by themselves and serve as a mortise for fixing and brightening the colors already present. You have already surmised that I refer to copper salts. In olden days when we cooked our peas and beans in the brass kettle it was always noticed that when the kettle was not scoured the color of the peas or beans was markedly deepened and they were a brighter green after cooking than they were before. This gave the hint and it was soon seen that it was the verdigris of the copper kettle which caused this. It was but one step from this to the artificial use of copper salts for greening vegetables. It is true that it is claimed that these copper salts form organic compounds with the vegetable matter and become inert. It seems to me that it is likewise true that during digestion these organic compounds are dissolved and the copper is again set free. While it may therefore exercise its functions in the stomach producing nausea and emesis, it may exercise them in the large and small intestines producing its well-known styptic or astringent effect.

I do not think that any of the health officials here would advocate the use of a substance in food which would tend to produce continual constipation as copper salts do when they reach the large and small intestines.

I must call the attention of you gentlemen to chemical antiseptics. I mean by chemical antiseptics those chemical compounds which have antiseptic properties and which in themselves are not condimental. I do not refer to salt, sugar and vinegar, alcohol or wood smoke, which are all both condimental

and preservative. But I do refer to such substances as borax, boric acid, salicylic acid, sulphurous acid and sulphites, formaldehyde and fluorides, and many other substances which in small quantities do not reveal themselves either by taste or odor. The use of these bodies as food preservatives is only restricted from becoming universal by prohibitive legislation.

It may be said that there is a necessity for using food preservatives. This may be true in many cases and in such cases where the consumer demands the addition of chemical preservatives in necessary cases there can be no valid objection to their use. But their effect upon the health must not be neglected. It is not sufficient for the user of these antiseptics to say that they are harmless in the sense that they do not produce any immediate evil effects. It is claimed by the advocates of antiseptics that they are used in minute quantities and in these quantities, even if the substances themselves are injurious, the foods to which they are added cannot be. But the health official can not admit the argument *de minimis*, and the courts, in many instances, have held that where the law prohibits the addition of an injurious substance the fact that it is present in small quantities is no justification. Sometimes substances which are prohibited by law occur naturally in foods. For instance, boric acid occurs naturally in wines, benzoic acid in cranberries and traces of salicylic acid in strawberries and other small fruits. But this itself is no justification and does not admit of an additional quantity added for preservative purposes. In our hygienic experiments at Washington we showed that borax and boric acid exercise a markedly injurious effect. It was not poisonous, produced no dangerous symptoms, but was shown to be generally useless and reprehensible. It tended to reduce the weight of the body, diminish the appetite, and when used in large quantities to produce headaches and a feeling of distress in the stomach. It interfered very markedly with the metabolic processes, disturbing the balance between the ingested and excreted food elements, and in other ways effecting in a marked degree the organic functions. Now it might be easily inferred that other bodies producing the same effects in foods would have, to some extent, the same effects upon the body. This, of course, is not wholly logical but inferential. We showed that 80 per cent. of the borax ingested was excreted

through the kidneys, thus overloading those already overworked organs. The other twenty per cent. came through the skin, and there is no reason to believe that it was particularly beneficial to the texture of the skin. It was easy enough to keep the skin clean in other ways rather than by dosing it with borax from the inside.

I do not preach any radical doctrine in regard to chemical antiseptics. Those that are used in food perhaps can not be said to be absolutely poisonous; but I can see no reason for the use of any of them except a desire to increase the profits of the manufacturer. We surely have no objection to a reasonable profit being made by food manufacturers and food dealers. That is necessary. But it should be a legitimate profit, and should not depend upon the use of any chemical reagents of this kind whose presence is entirely unknown to the consumer. I believe the health officials of the country should stand together as a unit in this purpose, namely, to exclude all bodies from foods which nature has not put there except those that are absolutely necessary in the processes of manufacture. Exclude from foods all artificial colors and all chemical antiseptics, save in cases where the consumer demands on his own accord their addition for special purposes. In other words, 99 men would not be compelled to eat a chemical preservative in a food because one man wants it there.

In the case of artificial colors I should not apply the above principle quite so broadly to those manufactured foods which are mixtures and have no natural tint or color, such as candies, ices and many desserts. There the addition of a harmless color does not deceive because the manufactured article has no natural color of its own and it probably does not, inasmuch as these substances are not frequently eaten, tend to produce any harmful effect.

If the above position in regard to colors and antiseptics is regarded as too rigid, then the next best position is to require that all food products artificially colored or containing chemical preservatives should be plainly labeled to that effect, so that the consumer might at least know the fact. It seems to me that the duty of the health official is in every way possible to conserve the public health. He should see to it that pure air and pure water are supplied to the people over whom he has control, and above

all, that they should receive wholesome food, as fresh as it can be, and if preserved, preserved in some unobjectionable way either by the well known condimental preservatives mentioned above or by desiccation or by sterilization. In the light of our present knowledge it is safer to exclude artificial colors and antiseptics from food products.

Dr. Lewis—Is there any discussion of Dr. Wiley's paper?

Dr. Darlington—I would just like to say a word for Dr. Wiley, for I think it is one of the most important works that is now taking place in the United States. It certainly is a long. long step toward health and sanitation to have pure food.

I think Dr. Wiley should be supported by everybody, in every way; and I want to say that, as far as New York city is concerned, he will have the most hearty cooperation in everything that he has mentioned in that paper.

Dr. Johnson—Mr. Commissioner, I desire to offer a resolution of thanks for the valuable paper that has been read this evening by Dr. Darlington. It is very instructive, and one of great importance, and I think this convention appreciates it. I will offer that resolution.

Dr. Phillips—It gives me great pleasure to second that motion.

(The resolution was put, and unanimously carried by the Conference.)

Dr. Lewis—This closes the work which has been laid out for the Fourth Sanitary Conference, and brings our labors to a close.

In dismissing the meeting, permit me to express to you the feelings of the Department of Health in regard to your presence here. We feel encouraged by your coming here; we feel that we have been instructed by your presence and your discussions on the different subjects, and in every way it will be a great advantage to the Department for the coming year.

If you gentlemen have in any way profited by the meeting, as we trust you have, the other object of its having been called will have been fully consummated.

I thank you,—I thank you for the privilege of shaking you by the hand, of hearing you speak, and I hope that we may all of us be here another year, to repeat this conference.

(The Conference adjourned *sine die.*)